

# SC401, SCRUBTEC 344

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## *Service Manual*

### **Advance Model Numbers:**

9087394020 SC401 17 B  
9087395020 SC401 17 BD

### **Nilfisk Model Numbers:**

9087391020 SC401 43 B  
9087390020 SC401 43 B FULL PKG  
9087392020 SC401 43 E  
9087393020 SC401 43 BD  
9087398020 SC401 43 BD FULL PKG  
9087396020 SCRUBTEC 344 B COMBI  
9087397020 SCRUBTEC 344 E



English

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## 03 - General Information

### Machine General Description

The SC401, SCRUBTEC 344 is a “walk-behind” scrubber industrial machine designed to wash and dry floors in one pass. The machine is powered by on-board batteries or cord power supply. The machine features a floor disc brush, controlled detergent solution dosing and a rear squeegee with rubber blades that vacuums and dries the floor.

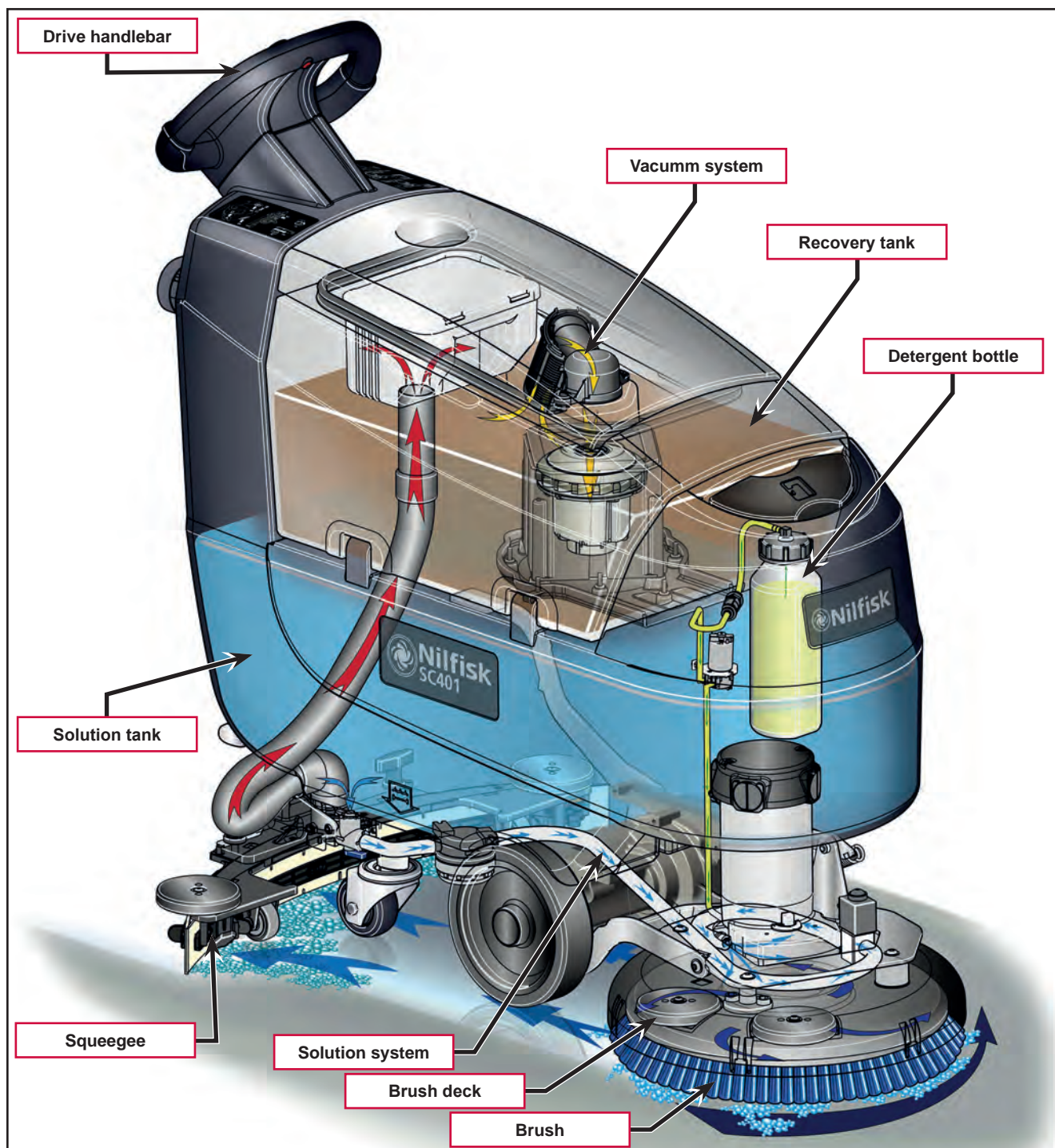


Figure 1:

## Service Manual Purpose and Field of Application

The Service Manual is a technical resource intended to help service technicians when carrying out maintenance and repairs on the scrubbers, to guarantee the best cleaning performance and a long working life for the machine.

Please read this manual carefully before performing any maintenance and repair procedure on the machine.

## Other Reference Manuals

Model	Model No.	Instructions for Use	Spare Parts List
Advance SC401 17 B	9087394020	9100002290	9100002293
Advance SC401 17 BD	9087395020		
Nilfisk SC401 17 B FULL PKG	9087390020	9100002291	9100002294
Nilfisk SC401 17 B	9087391020		
Nilfisk SC401 17 BD	9087393020		
Nilfisk SC401 17 BD FULL PKG	9087398020		
Nilfisk SCRUBTEC 344 B COMBI	9087396020		
Nilfisk SC401 17 E	9087392020	9100002292	9100002295
Nilfisk SCRUBTEC 344 E	9087397020		

Assembly Instructions	Instruction Code	Machines concerned
Key Kit	9100002549	Nilfisk Battery
Detergent Kit	9100002550	Nilfisk Battery
Battery charger kit	9100002551	Nilfisk Battery
Counter hour 24V KIT	9100002547	Advance / Nilfisk Battery
USB port kit	9100002548	Advance / Nilfisk Battery
Trackclean kit	9100002586	Advance / Nilfisk Battery

These manuals are available at:

- Local Advance or Nilfisk retailer
- Advance website: [www.advance-us.com](http://www.advance-us.com)
- Nilfisk website: [www.nilfisk.com](http://www.nilfisk.com)
- EZ-Data application



## Conventions

Forward, backward, front, rear, left or right are intended with reference to the operator's position, that is to say in driving position.

## Name Plate

Reference to Figure 2

The machine serial number and model name are marked on the plate (see the example to the side).

Model number and year of production (Date code: A18, as January 2018) are marked on the same plate.

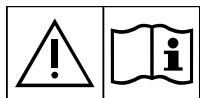


Figure 2:

## Safety

The following symbols indicate potentially dangerous situations. Always read this information carefully and take all necessary precautions to safeguard people and property.

### Visible Symbols on the Machine



**WARNING:** Carefully read all the instructions before performing any operation on the machine.



**WARNING:** Do not wash the machine with direct or pressurized water jets.



**WARNING:** Do not use the machine on slopes with a gradient exceeding the specifications.

## Symbols

The following symbols are used to help you recognize the information concerning the safety and the prevention of problems.



**DANGER:** Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.



**WARNING:** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



**CAUTION:** Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.



**Note:** Indicates an important informational message.

## General Safety Instructions

Specific warnings and cautions to inform about potential damages to people and machine are shown below.



### **DANGER: BATTERY MODELS**

- *Before performing any machine maintenance, repair, cleaning or replacement procedure, disconnect the battery connector and remove the ignition key (if equipped).*
- *When using lead (WET) batteries, keep sparks, flames and smoking materials away from the batteries. During the normal operation explosive gases are released.*
- *When using lead (WET) batteries, battery charging produces highly explosive hydrogen gas. During battery charging, lift the recovery tank and perform this procedure in well-ventilated areas and away from naked flames.*



### **DANGER: CORD MODELS**

- *Before performing any maintenance, repair, cleaning or replacement procedure disconnect the plug from the electrical mains.*



### **DANGER: ALL MODELS**

- *This machine must be used by properly trained operators only.*
- *Do not wear jewels when working near electrical components.*
- *Do not work under the lifted machine without supporting it with safety stands.*
- *Do not operate the machine near toxic, dangerous, flammable and/or explosive powders, liquids or vapours. This machine is not suitable for collecting dangerous powders.*



### **CAUTION: BATTERY MODELS**

- *Before using the battery charger, ensure that frequency and voltage values, indicated on the machine serial number plate, match the electrical mains voltage.*
- *Do not pull or carry the machine by the battery charger cable and never use the battery charger cable as a handle. Do not close a door on the battery charger cable, or pull the battery charger cable around sharp edges or corners. Do not run the machine on the battery charger cable.*
- *Keep the battery charger cable away from heated surfaces.*
- *Do not charge the batteries if the battery charger cable or the plug are damaged. If the machine is not working as it should, has been damaged, left outdoors or dropped into water, return it to the Service Center.*
- *To reduce the risk of fire, electric shock, or injury, do not leave the machine unattended when it is plugged in. Before performing any maintenance procedure, disconnect the battery charger cable from the electrical mains.*
- *Do not smoke while charging the batteries.*
- *To avoid any unauthorized use of the machine, remove the ignition key.*
- *Do not leave the machine unattended without being sure that it cannot move independently.*
- *(Only for machines with drive system): When the machine is to be pushed for service reasons (missing or discharged batteries, etc.), the speed must not exceed 4 km/h.*

**CAUTION: CORD MODELS**

- *The machine power supply cable is grounded and the relevant plug is grounded too. In case of machine malfunction or breakdown, grounding connection reduces the risk of electric shock.*
- *The power supply cable plug must be connected to an appropriate outlet, which is grounded according to law in force.*
- *Improper connection can cause electric shock. Consult a qualified technician to make sure that the outlet is properly grounded.*
- *Do not tamper with the power supply cable plug. If the power supply cable plug cannot be connected to the outlet, have new grounded outlet installed by a qualified technician, according to the law in force.*
- *Before connecting the power supply plug to the electrical mains, check that frequency and voltage, shown on the machine serial number plate (29), match the electrical mains voltage.*
- *Do not unplug the machine by pulling the supply cable. To unplug, grasp the plug, not the cable.*
- *Do not handle the plug or the machine with wet hands.*
- *Turn off all controls before unplugging.*
- *Regularly check the power supply cable for damages, cuts, cracks and wear. If necessary, replace it.*
- *If the power supply cable is damaged, it must be replaced by the Manufacturer or by an authorised Service Centre.*
- *Do not pull or carry the machine by the power supply cable and never use the power supply cable as a handle. Do not close a door on the power supply cable, or pull the power supply cable around sharp edges or corners. Do not run the machine on the power supply cable.*
- *The rotating brush must not come into contact with the power supply cable.*
- *Keep the supply cable away from heated surfaces.*
- *To reduce the risk of fire, electric shock, or injury, do not leave the machine unattended when it is plugged in. Disconnect the machine from the electrical mains when not in use and before performing maintenance procedures.*
- *If the machine:*
  - *Does not work properly*
  - *Is damaged*
  - *Has water or foam leaks*
  - *Has been left outdoors exposed to bad weather conditions*
  - *Is wet or has been dropped into water,*
- *turn it off immediately and contact the Nilfisk Service Center or a qualified technician.*

**CAUTION: ALL MODELS**

- *Carefully read all the instructions before performing any maintenance/repair procedure.*
- *This machine is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the machine by a person responsible for their safety.*
- *Children should be supervised to ensure that they do not play with the machine.*
- *Close attention is necessary when used near children.*
- *Always protect the machine against the sun, rain and bad weather, both under operation and inactivity condition. This machine must be used indoors in dry conditions, it must not be used or kept outdoors in wet conditions.*
- *Before using the machine, close all doors and/or covers as shown in the Instructions for Use Manual.*
- *Use only as shown in this Manual. Use only Nilfisk's recommended accessories.*
- *Check the machine carefully before each use, always check that all the components have been properly assembled before use. If the machine is not perfectly assembled it can cause damages to people and properties.*
- *Take all necessary precautions to prevent hair, jewels and loose clothes from being caught by the machine moving parts.*
- *Do not use the machine on slopes.*
- *Do not tilt the machine more than the angle indicated on the machine itself, in order to prevent instability.*
- *Do not use the machine in particularly dusty areas.*
- *Use the machine only where a proper lighting is provided.*
- *While using this machine, take care not to cause damage to people or objects.*
- *Do not bump into shelves or scaffoldings, especially where there is a risk of falling objects.*
- *Do not lean liquid containers on the machine, use the relevant can holder.*
- *The machine working temperature must be between +32 °F and +104 °F (0 °C and +40 °C).*
- *The machine storage temperature must be between +32 °F and +104 °F (0 °C and +40 °C).*
- *The humidity must be between 30 % and 95 %.*
- *When using floor cleaning detergents, follow the instructions on the labels of the detergent bottles.*
- *To handle floor cleaning detergents, wear suitable gloves and protections.*
- *Do not use the machine as a means of transport.*
- *Do not allow the brush to operate while the machine is stationary to avoid damaging the floor.*



- *In case of fire, use a powder fire extinguisher, not a water one.*
- *Do not tamper with the machine safety guards and follow the ordinary maintenance instructions scrupulously.*
- *Do not allow any object to enter into the openings. Do not use the machine if the openings are clogged. Always keep the openings free from dust, hairs and any other foreign material which could reduce the air flow.*
- *Do not remove or modify the plates affixed to the machine.*
- *This machine cannot be used on roads or public streets.*
- *Pay attention during machine transportation when temperature is below freezing point. The water in the recovery tank or in the hoses could freeze and seriously damage the machine.*
- *Use only the brushes supplied with the machine or those specified in the Instructions for Use Manual. Using other brushes could reduce safety.*
- *In case of machine malfunctions, ensure that these are not due to lack of maintenance. If necessary, request assistance from the authorised personnel or from an authorised Service Center.*
- *If parts must be replaced, require ORIGINAL spare parts from an Authorised Dealer or Retailer.*
- *To ensure machine proper and safe operation, the scheduled maintenance shown in the relevant chapter of this Manual, must be performed by the authorised personnel or by an authorised Service Center.*
- *Do not wash the machine with direct or pressurised water jets, or with corrosive substances.*
- *The machine must be disposed of properly, because of the presence of toxic-harmful materials (batteries, etc.), which are subject to standards that require disposal in special centres.*

## ***Lifting The Machine***



***WARNING: Do not work under the lifted machine without supporting it with safety stands.***

## ***Transporting The Machine***



***WARNING: Before transporting the machine, make sure that:***

- *All covers are closed.*
- *The recovery tank and the detergent tank are empty.*
- *The batteries are disconnected.*
- *The ignition key is removed.*
- *The machine is securely fastened to the means of transport.*

## Technical Specifications

### Battery Models

Model	SC401, SCRUBTEC 344	
	No Drive	Drive
Solution tank capacity	7,9 US gal (30 liters)	
Recovery tank capacity	7,9 US gal (30 liters)	
Machine length	46,5 in (1.180 mm)	
Machine width with squeegee	28 in (720 mm)	
Machine width without squeegee	18 in (458 mm)	
Machine height	41,5 in (1.055 mm)	
Cleaning width	17 in (430 mm)	
Deck right/left offset	1,8 in / 0 in (45 mm / 0 mm)	
Front wheel diameter	7,8 in (200 mm)	
Front wheel specific pressure on the floor (*)	116 psi (0,8 N/mm <sup>2</sup> )	
Rear wheel diameter	3,1 in (80 mm)	
Rear wheel specific pressure on the floor (*)	290 psi (2,0 N/mm <sup>2</sup> )	
Brush/pad diameter	17 in (430 mm)	
Brush pressure	55 lb (25 kg)	
Solution flow values	0,08 - 0,18 - 0,53 gpm (0,3 / 0,7 / 2,0 L/m)	
Detergent bottle capacity	0,26 US gal (1 liters)	
Detergent System detergent percentage	0,25 ÷ 2,0 %	
Sound pressure level at workstation (ISO 11201, ISO 4871, EN 60335-2-72) (LpA)	65 ±3 dB(A)	
Sound pressure level at workstation in silent mode (LpA)	60 ±3 dB(A)	
Machine sound power level (guaranteed value ISO 3744, ISO 4871, EN 60335-2-72) (LwA)	80 dB(A)	
Vibration level at the operator's arms (ISO 5349-1, EN 60335-2-72)	< 98 in/s <sup>2</sup> (< 2,5 m/s <sup>2</sup> )	
Maximum gradient when working	2 %	
Drive system motor power	-	0.2 hp (150 W)
Drive speed (variable)	-	0 ÷ 3,1 mi/h (0 ÷ 5 km/h)
Vacuum system motor power	0,4 hp (280 W)	
Vacuum system circuit capacity	35,4 in H <sub>2</sub> O (900 mm H <sub>2</sub> O)	
Brush motor power	0,6 hp (450 W)	
Brush motor speed	140 rpm	

Model	SC401, SCRUBTEC 344	
	No Drive	Drive
Total power draw (EN 60335-2-72)	21 A (0,5 kW)	25 A (0,6 kW)
IP protection class	X4	
Protection class (electric)	III (I for on board battery charger)	
Battery compartment size	13,8 x 13,8 x 10,2 in (350 x 350 x 260 mm)	
System voltage	24V	
Standard batteries (q.ty 2)	Advance: 98 Ah C20 GEL / 105 Ah C20 WET Nilfisk: 12V-76 Ah GEL MONOBLOC	
Battery charger	-	24V 10A
Operating time (standard batteries) (EN 60335-2-72)	2,6 h	2,4 h
Weight without batteries and with empty tanks	134 lb (61 kg)	161 lb (73kg)
Gross vehicle weight (GVW)	333 lb (151 kg)	359 lb (163 kg)
Shipping weight (basic / full package)	214 lb (97 kg)	240 lb (109 kg)
	340 lb (154 kg)	366 lb (166 kg)

(\*) Machines have been tested under the following conditions:

- Battery maximum size
- Maximum brush and squeegee size
- Full detergent tank
- Optional equipment installed
- Wheel weight checked
- Print on the floor checked on cement for each single wheel
- Result expressed as maximum value for both front and rear wheels

## Cord Models

Model	SC401, SCRUBTEC 344
Solution tank capacity	7,9 US gal (30 liters)
Recovery tank capacity	7,9 US gal (30 liters)
Machine length	46,4 in (1.180 mm)
Machine width with squeegee	28,3 in (720 mm)
Machine width without squeegee	18 in (458 mm)
Machine height	41,5 in (1.055 mm)
Cleaning width	17 in (430 mm)
Deck right/left offset	1,8 in / 0 in (45 mm / 0 mm)
Front wheel diameter	7,9 in (200 mm)
Front wheel specific pressure on the floor (*)	116 psi (0,8 N/mm <sup>2</sup> )
Rear wheel diameter	3,1 in (80 mm)
Rear wheel specific pressure on the floor (*)	290 psi (2,0 N/mm <sup>2</sup> )
Brush/pad diameter	17 in (430 mm)
Brush pressure	66 lb (30 kg)
Solution flow values	0,08 / 0,18 / 0,53 gpm (0,3 / 0,7 / 2,0 L/m)
Sound pressure level at workstation (ISO 11201, ISO 4871, EN 60335-2-72) (LpA)	68 ±3 dB(A)
Machine sound power level (ISO 3744, ISO 4871, EN 60335-2-72) (LwA)	87 dB(A)
Vibration level at the operator's arms (ISO 5349-1, EN 60335-2-72)	< 98 in/s <sup>2</sup> (< 2,5 m/s <sup>2</sup> )
Maximum gradient when working	2 %
Vacuum system motor power	0,4 hp (280 W)
Vacuum system circuit capacity	35,4 in H <sub>2</sub> O (900 mm H <sub>2</sub> O)
Brush motor power	1 hp (750 W)
Brush motor speed	170 rpm
Total power draw (EN 60335-2-72)	4,3 A (1,0 kW)
IP protection class	X4
Protection class (electric)	I
Power supply	230 V - 50-60 Hz
Weight with empty tanks	247 lb (112 kg)
Gross vehicle weight (GVW)	317 lb (144 kg)
Shipping weight	326 lb (148 kg)

(\*) Machines have been tested under the following conditions:

- Maximum brush and squeegee size
- Full detergent tank
- Optional equipment installed
- Wheel weight checked
- Print on the floor checked on cement for each single wheel
- Result expressed as maximum value for both front and rear wheels



## Maintenance Schedule

### Battery Models

Procedure	Daily, after use	Weekly/ Monthly	Every 6 Months	Annually
Battery Charging				
Squeegee Cleaning				
Brush/pad cleaning				
Recovery tank, debris tray, and vacuum grid with float cleaning, and cover gasket check				
Detergent System cleaning and washing				
Squeegee blade check				
Solution Filter Cleaning				
Battery (WET) fluid level check				
Squeegee blade replacement				
Drive and brush motor check and cleaning				
Brush motor carbon brush check or replacement				

### Cord Models

Procedure	Daily, after use	Weekly/ Monthly	Every 6 Months	Annually
Squeegee Cleaning				
Brush/pad cleaning				
Recovery tank, debris tray, and vacuum grid with float cleaning, and cover gasket check				
Power supply cable check				
Squeegee blade check				
Solution Filter Cleaning				
Squeegee blade replacement				

## Know Your Machine (Battery)

### Control Panel View



Figure 3:

## Rear/Left Machine View

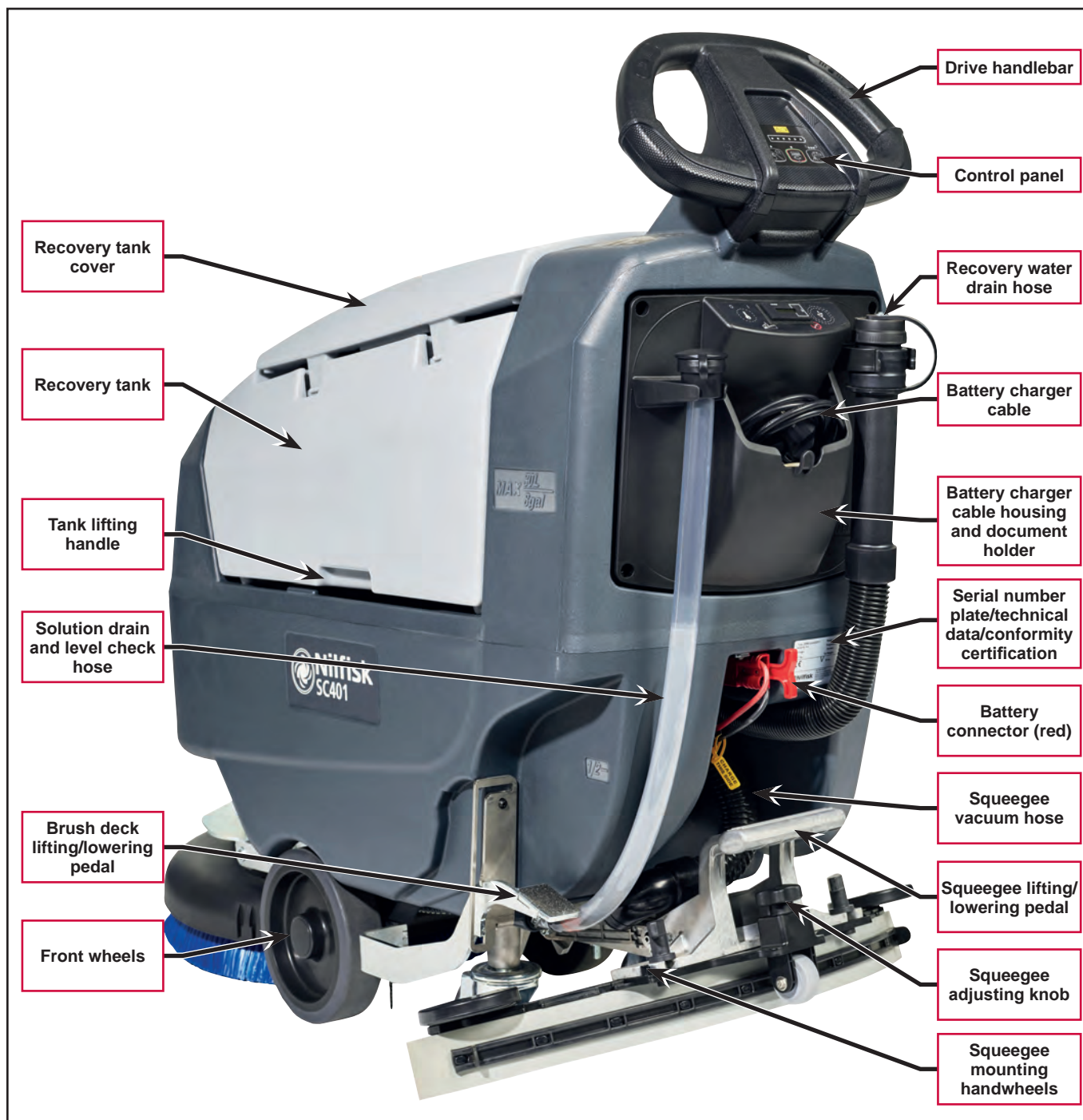


Figure 4:

## Front/Right Machine View



Figure 5:



## Know Your Machine (Cord)

### Control Panel View



Figure 6:



## Rear/Left Machine View

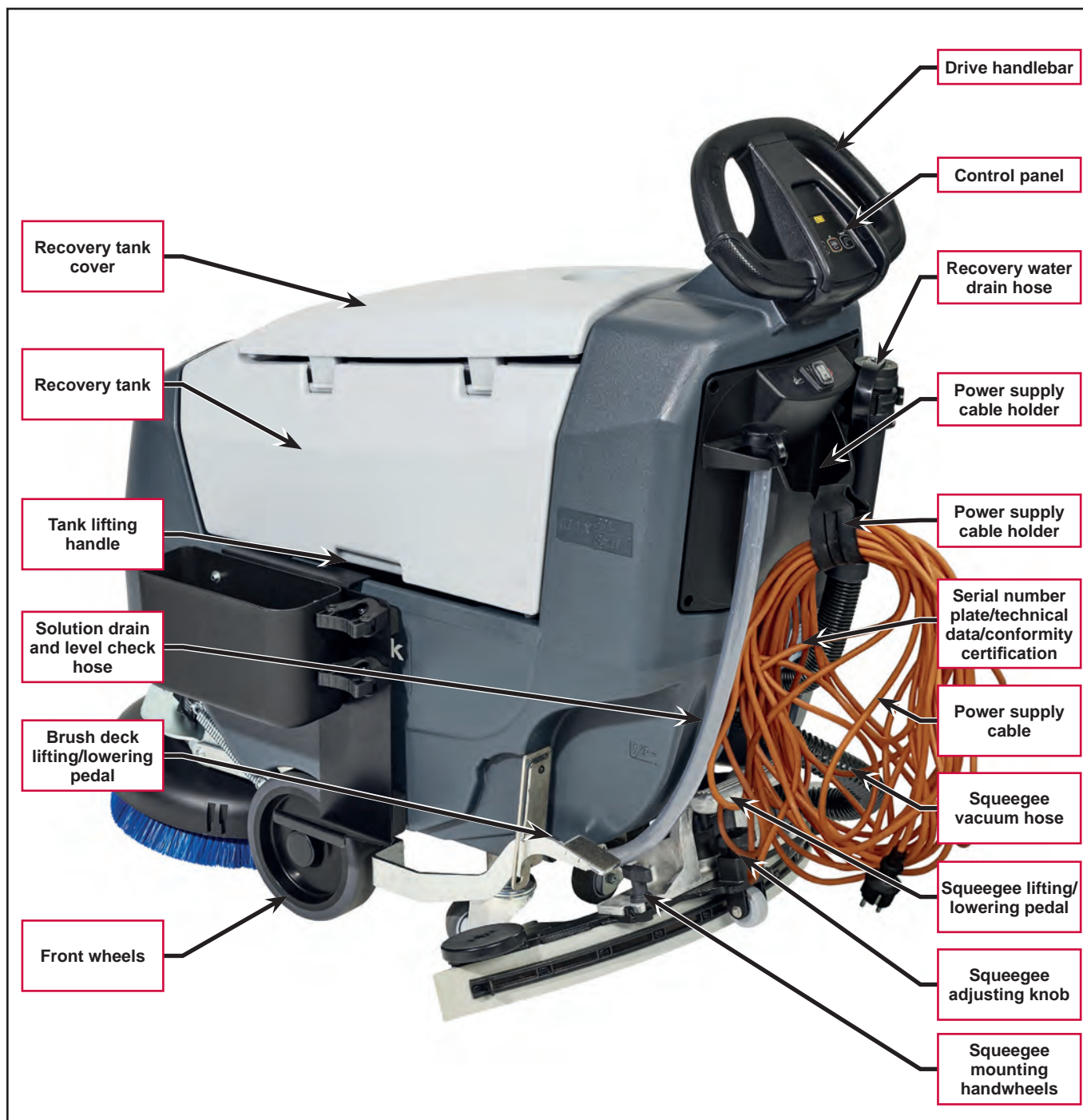


Figure 7:

**Front/Right Machine View****Figure 8:**

## Service and Diagnostic Equipment

Besides a complete set of standard meters, the following instruments are necessary to perform fast checks and repairs on Nilfisk machines:

- Laptop computer charged with the current version of EzParts, Adobe Reader and (if possible) Internet connection
- Digital Volt Meter (DVM)
- Amp clamp with possibility of making DC measurements
- Hydrometer
- Battery charge tester to check 12V batteries
- Static control wrist strap
- Dynamometric wrench set
- A copy of the Instructions for Use Manual and Spare Parts List of the machine to be serviced (provided with the machine or available at [www.advance-us.com](http://www.advance-us.com) or other Nilfisk websites).

The following equipment is also available at Nilfisk or Advance Centers:

- Vacuum water lift gauge, P/N 56205281

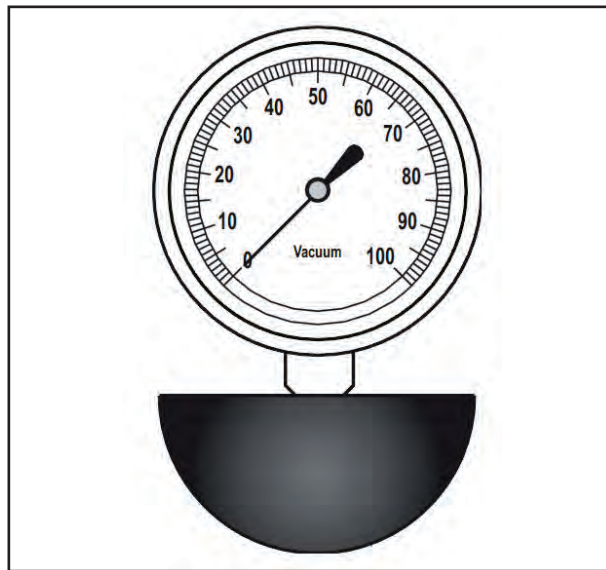


Figure 9:

## Service and Diagnostic Equipment (continues)

- Service Tool module NEO P/N 101221030
- NilfiskServiceTool software installed on the Laptop computer (see the Service tool installation guide or open the Internet browser, and type in the serveraddress: <https://ftp.niladv.org>.)

Type in Login ID and Password.

Login ID: **neotool**

Password: **nil2ool2015**



Figure 10:

- Programmer Electronic Cards ITALSEA P/N 1466207000



Figure 11:

## Dimensions

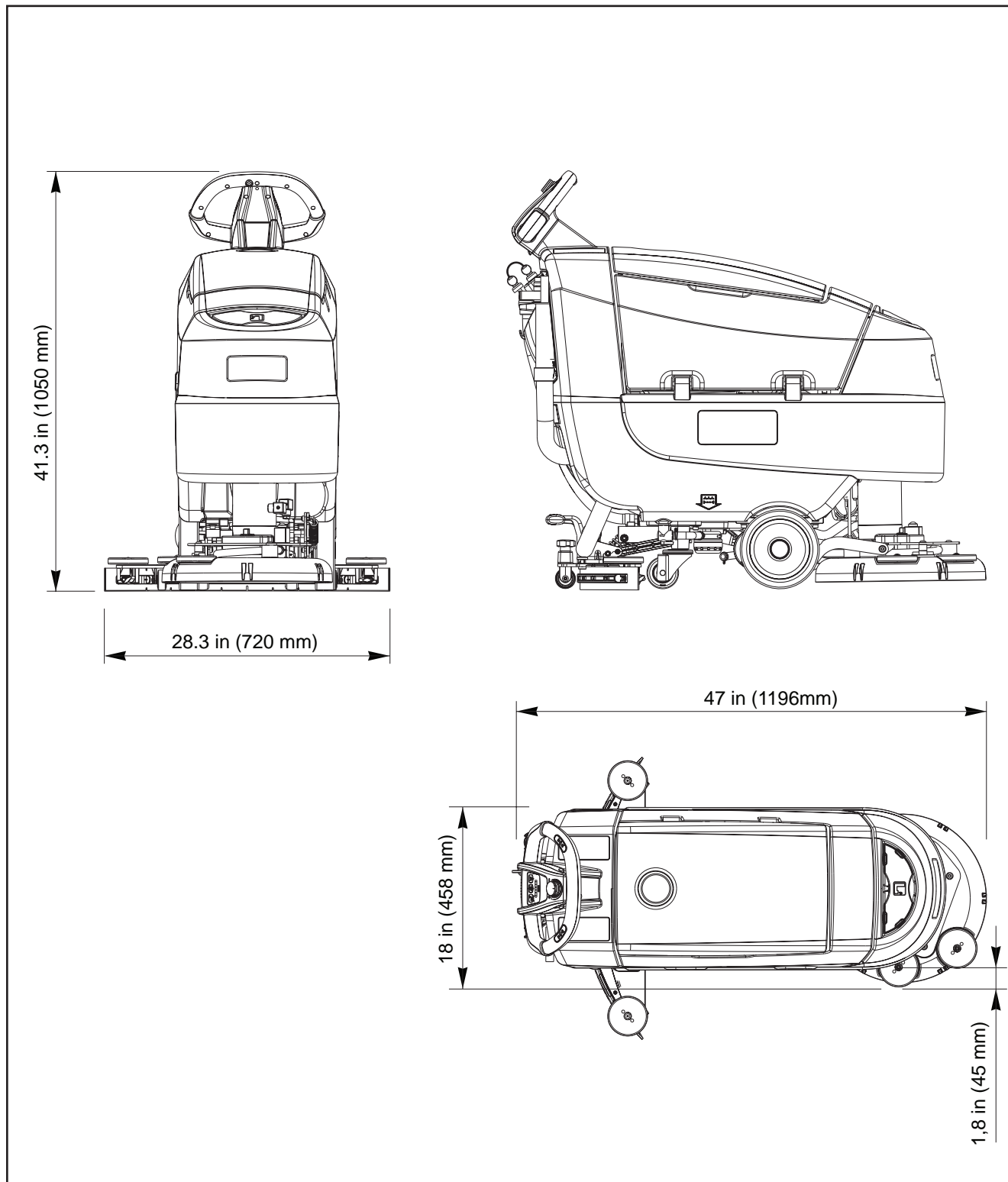


Figure 12:



## 04 - Control System - Battery

### Functional Description

The (electrical) functions of the machine and of the Main Machine Controller (EB1) are controlled via the handlebar with the 3 buttons on the User Interface Controller (EB2) and activation of the Operator Presence Sensors (S1, S2) inside the 2 handlebars (the position of these is indicated by the corresponding icons).

If present, the Ignition Key (K1) must be turned to the I position to turn on the machine.

The machine is turned on and off by pressing the



Main button

With the machine running, the battery charge level is displayed using the 6 LEDs of the battery symbol



When the machine is turned on, the brushing and vacuum functions are off, and only the electric drive system (if present) is active.

To activate the electric drive system (if present), activate at least 1 of the 2 Operator presence sensors



(S1, S2). The system reaches the set speed through the Speed Adjuster (RV1), if at least one of the sensors is active.

By pressing and holding the Reverse gear switch (SW1) along with the Operator presence sensors (S1, S2), the system activates the reverse gear until the button is pressed.

By pressing (for 2 sec.) the Main button when the machine is running, the brushing (with the solution flow preset to level 1) and vacuum (full power) functions are turned on or off. The LEDs on the Main and Vacuum buttons show the related ON status.

Brush rotation and the activation of the pump, however, also require the activation of at least 1 of the 2 Operator Presence Sensors (S1, S2).

The vacuum function can be activated with reduced power, deactivated or reactivated by pressing the



Vacuum system button in sequence. The corresponding LED provides the operator with information on the status of the function:

- LED turned off = function disabled
- LED turned on = function running at full power
- LED blinking 2 sec. ON - 0.5 sec. OFF = function running at reduced power (silent mode)

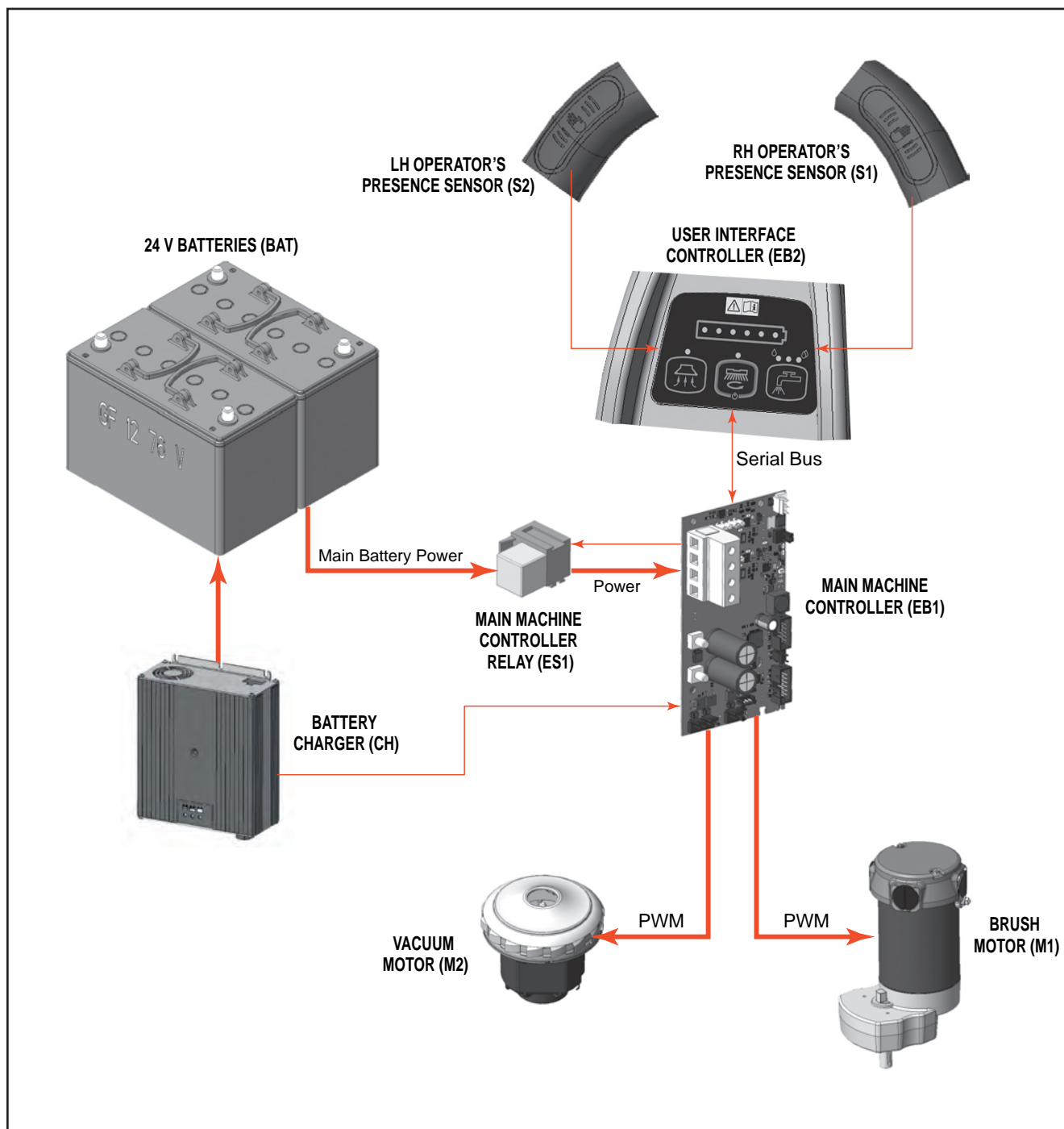
The solution flow can be increased to level 2, 3 or

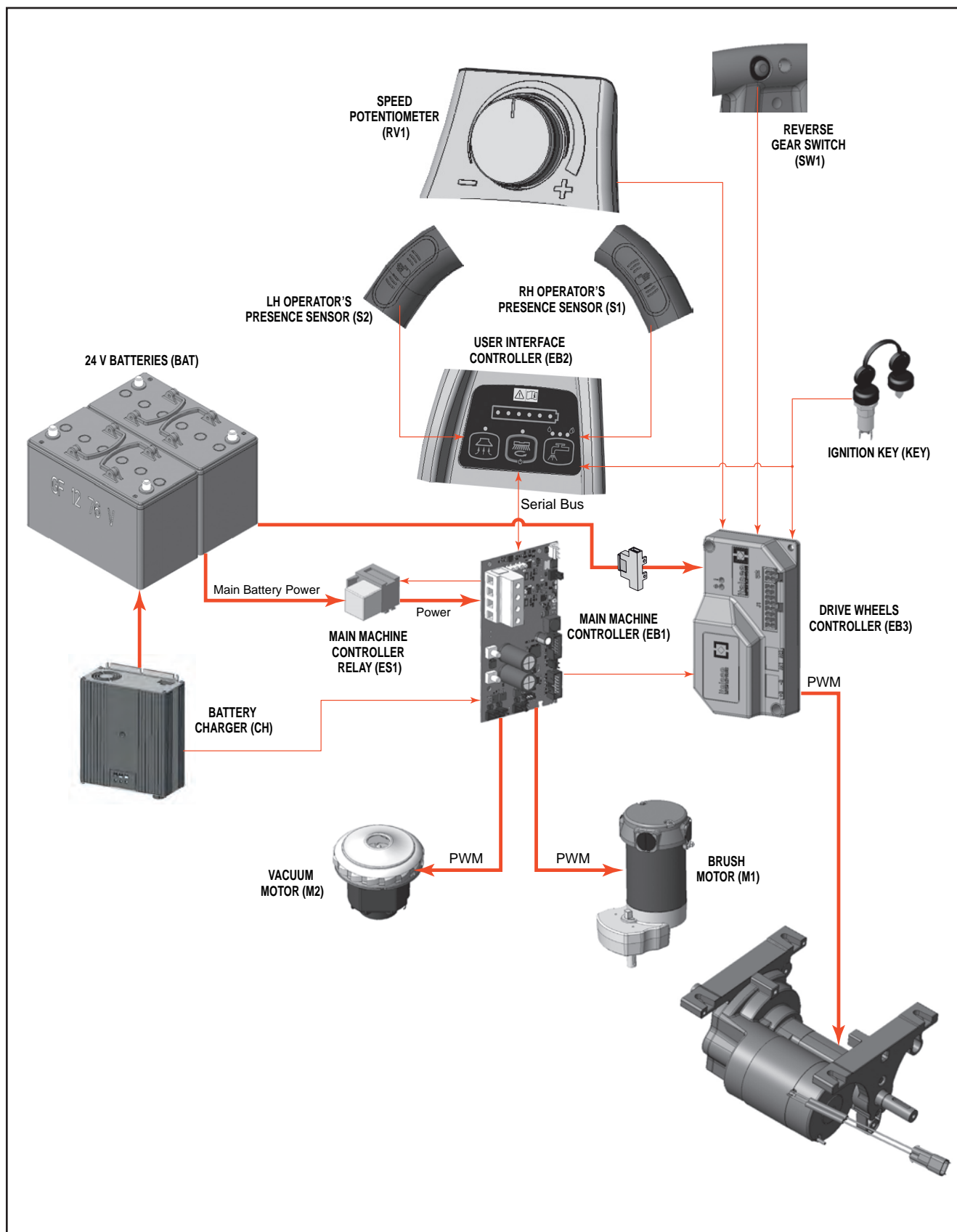


else disabled, via the Solution button. The corresponding LEDs provide the operator with information on the status of the function.





**Functional Block Diagram (no Drive)****Figure 1:**

**Functional Block Diagram (Drive)****Figure 2:**

## Wiring Diagram

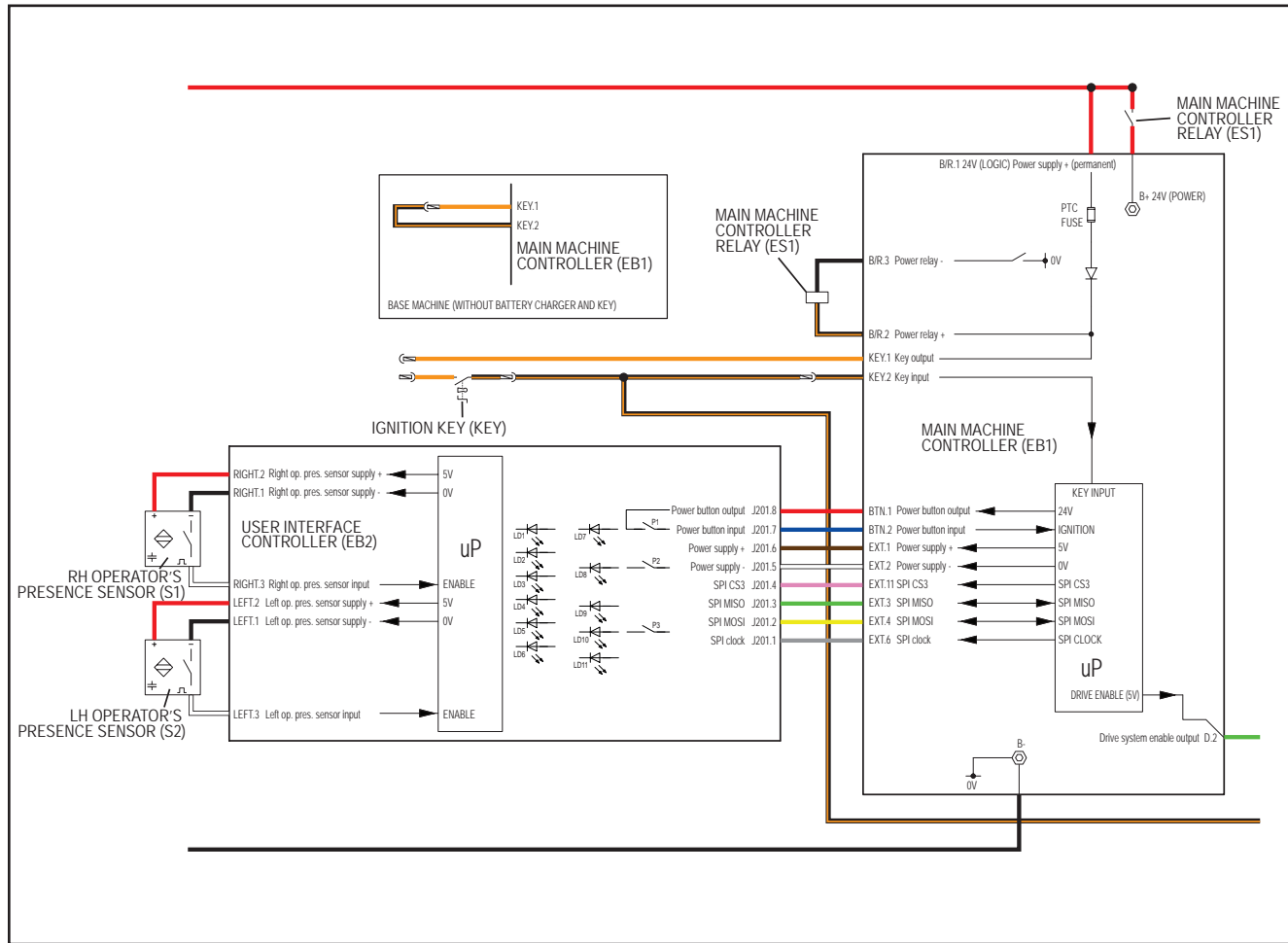


Figure 3:

## Component Locations



Figure 4:



## Maintenance and Adjustments

### Parameter Machine Settings

Parameters can be viewed by connecting the NEO Service Tool module, P/N 101221030 (A) to the Main Machine Controller (EB1) (B).

1. If equipped remove the ignition key, then disconnect the red battery connector.
2. Unscrew the 4 screws and remove the electronic component compartment cover.

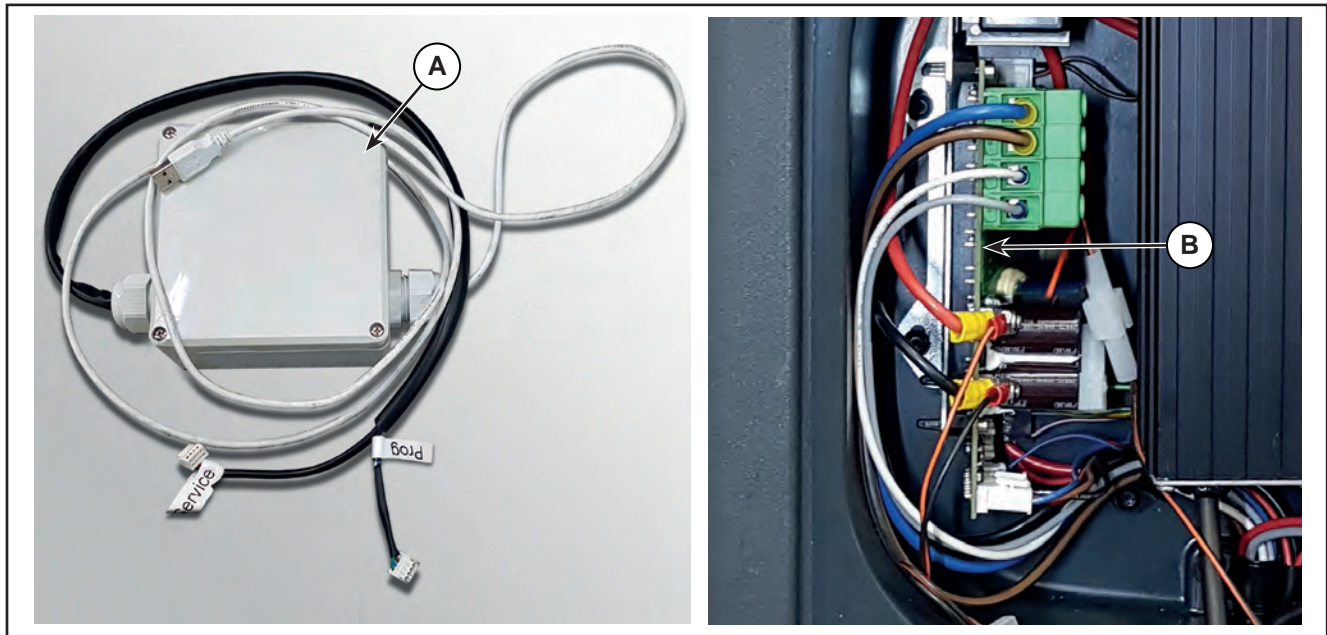


Figure 5:

3. Connect the cable marked PROG (C) to connector (D) and the cable marked SERVICE (E) to connector (F) on the Main Machine Controller (EB1).

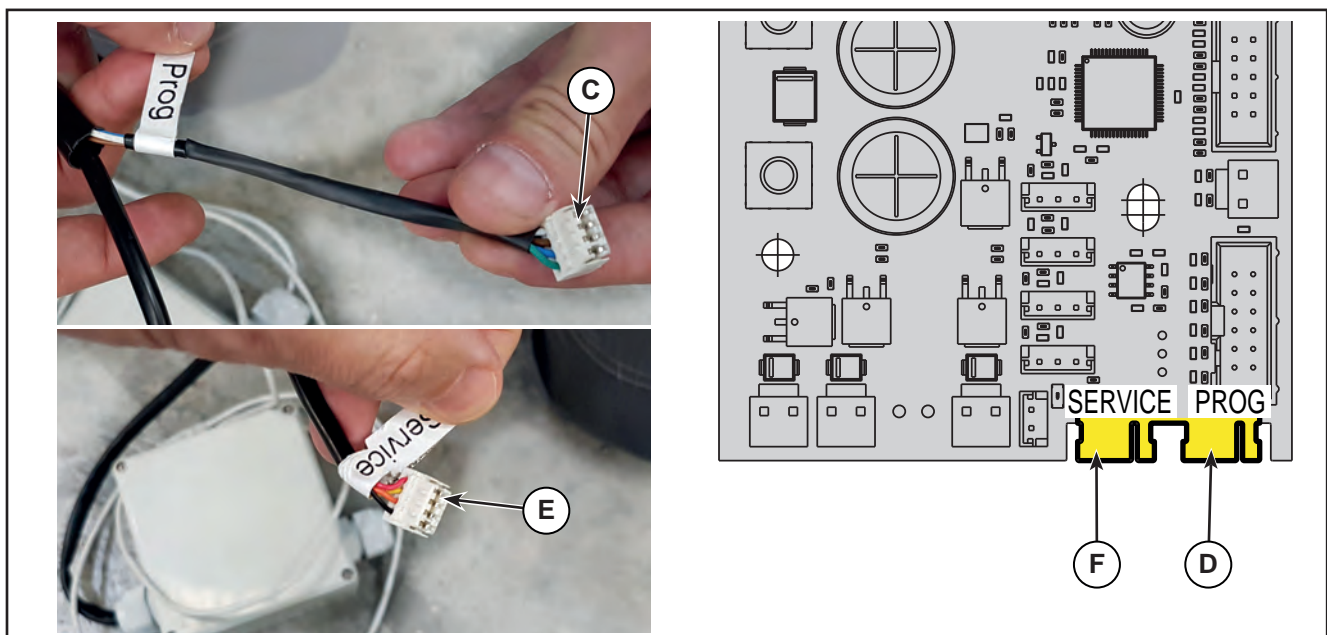


Figure 6:

# Parameter Machine Settings (continues)

- Connect the USB cable (G) of the NEO Service Tool module to a laptop computer (H) and start the NilfiskServiceTool software.
- Enter the Service/Tech access level password to the menu “SETTINGS” (I):

Access level	Password
Developer	N/D
<b>Service/Tech</b>	<b>tech</b>
Production	prod
NPI “New Product Introduction” (Engineers)	npi
Sales	sale
Customer	cust

- Access the parameters to “configure” (J).

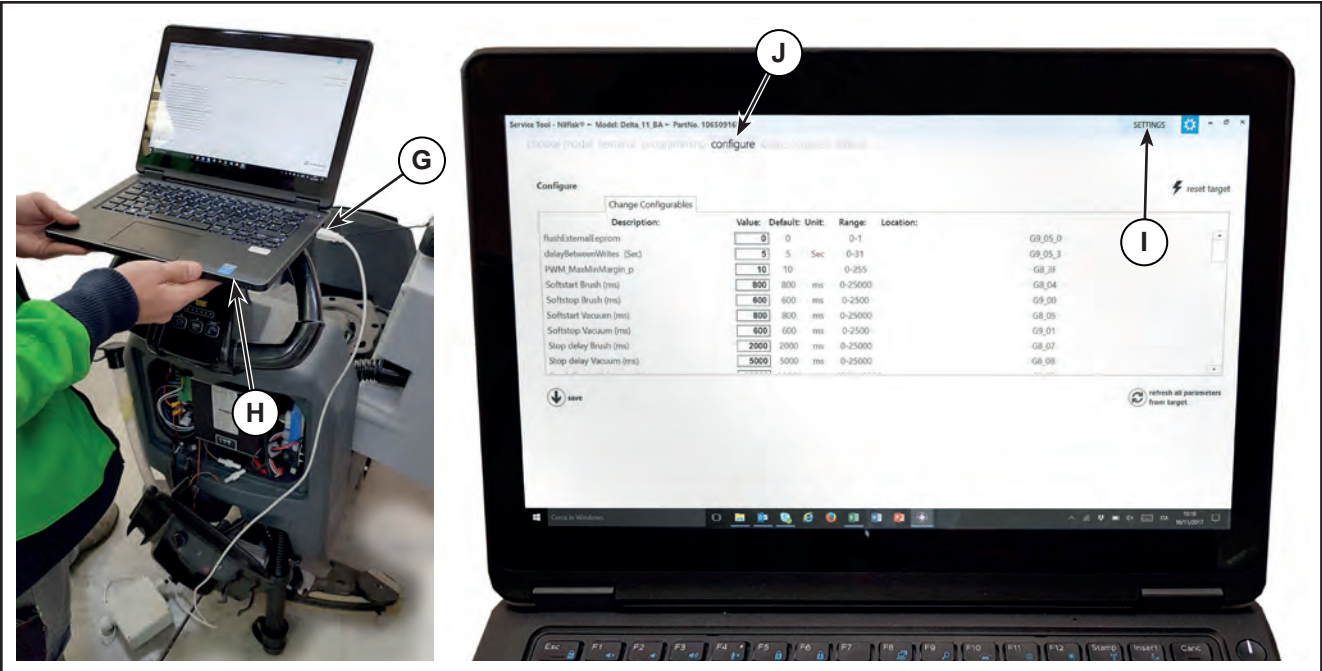


Figure 7:




**Machine Settings (continues)**

Parameter Description		Range	Resolution	Default	Permissions: - = not visible R = read only W = read & write					
					Developer	Service/Tech	Production	NPI	Sales	Customer
	Softstart Brush (ms)	0-25000	1	800	W	R	R	R	-	-
	Softstop Brush (ms)	0-2500	1	600	W	R	R	R	-	-
	Softstart Vacuum (ms)	0-25000	1	800	W	R	R	R	-	-
	Softstop Vacuum (ms)	0-2500	1	600	W	R	R	R	-	-
	Stopdelay Brush (ms)	0-25000	1	3000	W	W	R	R	-	-
	Stopdelay Vacuum (ms)	0-25000	1	5000	W	W	R	R	-	-
	Brush Target Voltage (mV)	16500-42000	1	28000	W	W	R	R	-	-
	Brush Reduced Voltage (mV)	16500-42000	1	20000	W	W	R	R	-	-
	Brush Voltage Transition time (ms)	0-25000	1	3000	W	W	R	R	-	-
	Reduced Brush Consumption (mA)	0-25500	1	9000	W	W	R	R	-	-
	Vacuum Target Voltage (mV)	16500-42000	1	28000	W	W	R	R	-	-
	Vacuum Reduced Voltage (mV)	16500-42000	1	16500	W	W	R	R	-	-
	Vacuum Voltage Transition time (ms)	0-25000	1	3000	W	W	R	R	-	-
	Solu. Pump Target Voltage (mV)	16500-42000	1	28000	W	W	R	R	-	-
	Det. Pump Target Voltage (mV)	16500-42000	1	28000	W	W	R	R	-	-
T1on	Pump state1 on time (ms)	5-255	1	7	W	W	R	R	-	-
T1off	Pump state1 off time (ms)	0-255	1	33	W	W	R	R	-	-
T2on	Pump state2 on time (ms)	5-255	1	17	W	W	R	R	-	-
T2off	Pump state2 off time (ms)	0-255	1	23	W	W	R	R	-	-
T3on	Pump state3 on time (ms)	5-255	1	40	W	W	R	R	-	-
T3off	Pump state3 off time (ms)	0-255	1	0	W	W	R	R	-	-
Tm	Pump time multiplier	1-255	1	100	W	W	R	R	-	-
K	Solution/Detergent flow ratio (x10)	0-1020	1	268	W	W	R	R	-	-
%1	Detergent Level 1 percentage (x10)	0-50	1	2	W	W	R	R	-	-
%2	Detergent Level 2 percentage (x10)	0-50	1	4	W	W	R	R	-	-
%3	Detergent Level 3 percentage (x10)	0-50	1	8	W	W	R	R	-	-
%4	Detergent Level 4 percentage (x10)	0-50	1	10	W	W	R	R	-	-
%5	Detergent Level 5 percentage (x10)	0-50	1	20	W	W	R	R	-	-
%6	Detergent Level 6 percentage (x10)	0-50	1	30	W	W	R	R	-	-
--- CALIBRATION PARAMETERS ---					W	R	-	-	-	-
	Current sum cutoff (mA)	0-51000	1	50000	W	R	R	R	-	-
	Brush peak current limit (mA)	0-51000	1	40000	W	R	R	R	-	-
	Vacuum peak current limit (mA)	0-51000	1	30000	W	R	R	R	-	-
	Brush continuous current limit (mA)	0-51000	1	25000	W	W	R	R	-	-
	Vacuum continuous current limit (mA)	0-51000	1	16000	W	W	R	R	-	-
	Time for continuous current overload (sec)	0-50	1	30	W	W	R	R	-	-
	Max softstart time multiplier	0-255	1	4	W	R	R	R	-	-
	Wait time softstart current limit (ms)	0-255	1	150	W	R	R	R	-	-
	Current limit during softstart (mA)	0-51000	1	50000	W	R	R	R	-	-



## Troubleshooting

### General System Fault Code

Display on the control panel	Meaning	Conditions	What to do	Reset
6 battery LEDs flashing.	Brush motor overload.	Brush motor current higher than parameter " <i>Brush continuous current limit</i> " (default: 25 Amp) for a period of time longer than parameter " <i>Time for continuous current overload</i> " (default: 30 sec.).	Check if there is dust or debris preventing the brush rotation.	Turn off the machine using the Main button 
		Brush motor peak current higher than parameter " <i>Brush peak current limit</i> " (default: 40 Amp).		
	Total current overload.	Brush + Vacuum motors current higher than parameter " <i>Current sum cutoff</i> " (default: 50 Amp) or " <i>Current limit during softstart</i> " (default: 50 Amp) for a period of time longer than parameter " <i>Time for continuous current overload</i> " (default: 30 sec.).	Check if there is dust or debris preventing the brush rotation.	
			Check if brush or vacuum motor are stuck / issue into the harness.	
Vacuum system button  LED flashing (fast flashing: 0.5 sec. ON - 0.5 sec. OFF).	Vacuum system motor overload.	Vacuum system motor current higher than parameter " <i>Vacuum continuous current limit</i> " (default: 16 Amp) for a period of time longer than parameter " <i>Time for continuous current overload</i> " (default: 30 sec.).	Check if there is dust or debris preventing the vacuum system motor fan rotation.	Turn off the machine using the Main button 
		Vacuum system motor peak current higher than parameter " <i>Vacuum peak current limit</i> " (default: 30 Amp).		

## Removal and Installation

### Main Machine Controller (EB1)



**WARNING:** Electrostatic sensitive device, observe precautions for handling. Use the specific ESD gloves. The operator should not wear a sweater, fleece or other wool or synthetic clothing when changing the PCB. The wrist strap must be connected to an earth ground. See the relevant instructions.



Figure 8:

1. If equipped remove the ignition key, then disconnect the red battery connector.
2. Unscrew the 4 screws and remove the electronic component compartment cover.
3. If present, remove the on-board battery charger (A) unscrewing the 4 screws (B).

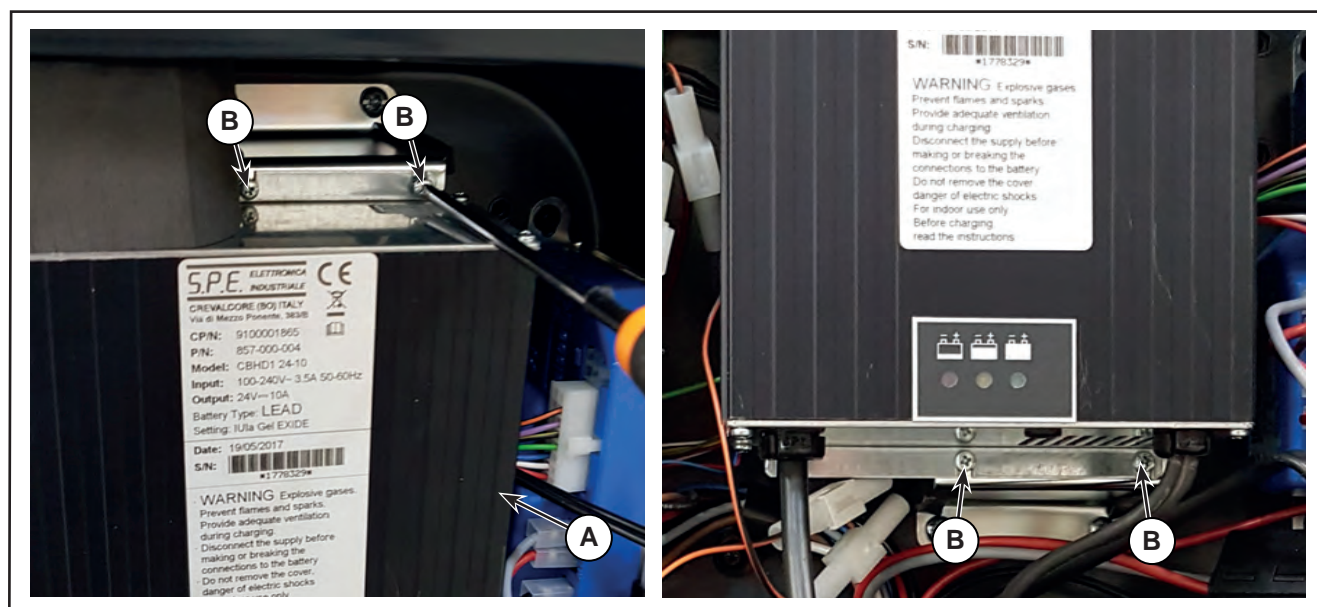


Figure 9:

## Main Machine Controller (EB1) (continues)

4. Disconnect the following connections:

- (C) and (D), main machine controller power supply connection (J106 B+) and (J107 B-).

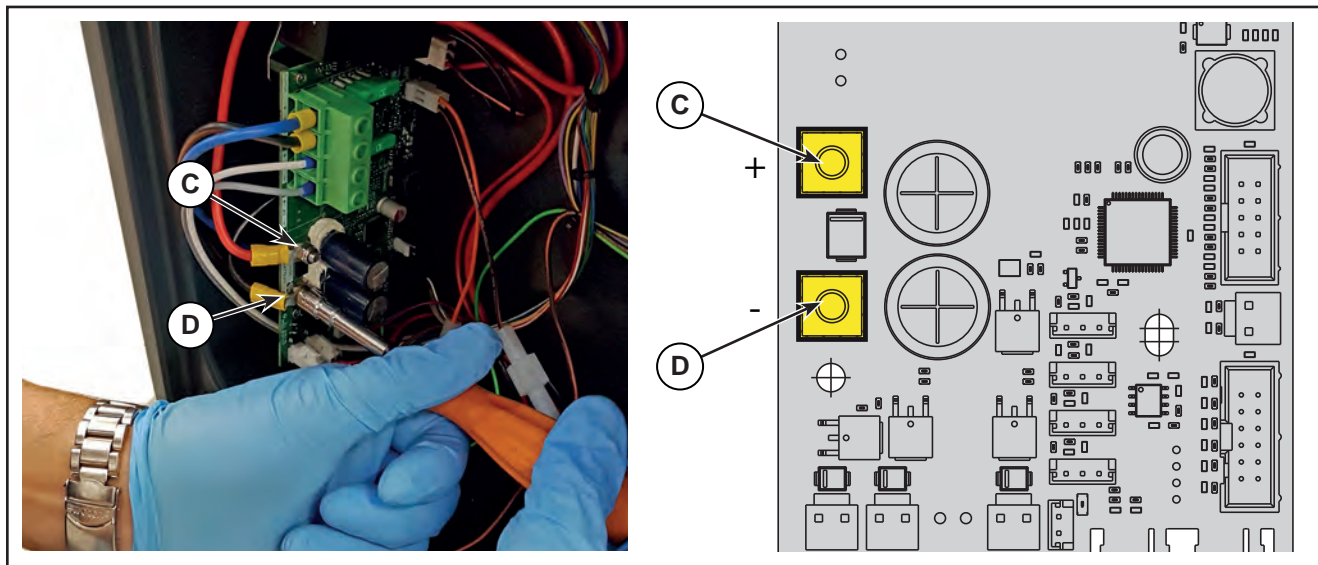


Figure 10:

- (E) and (F) Vacuum motor connection (J403 OUT2).

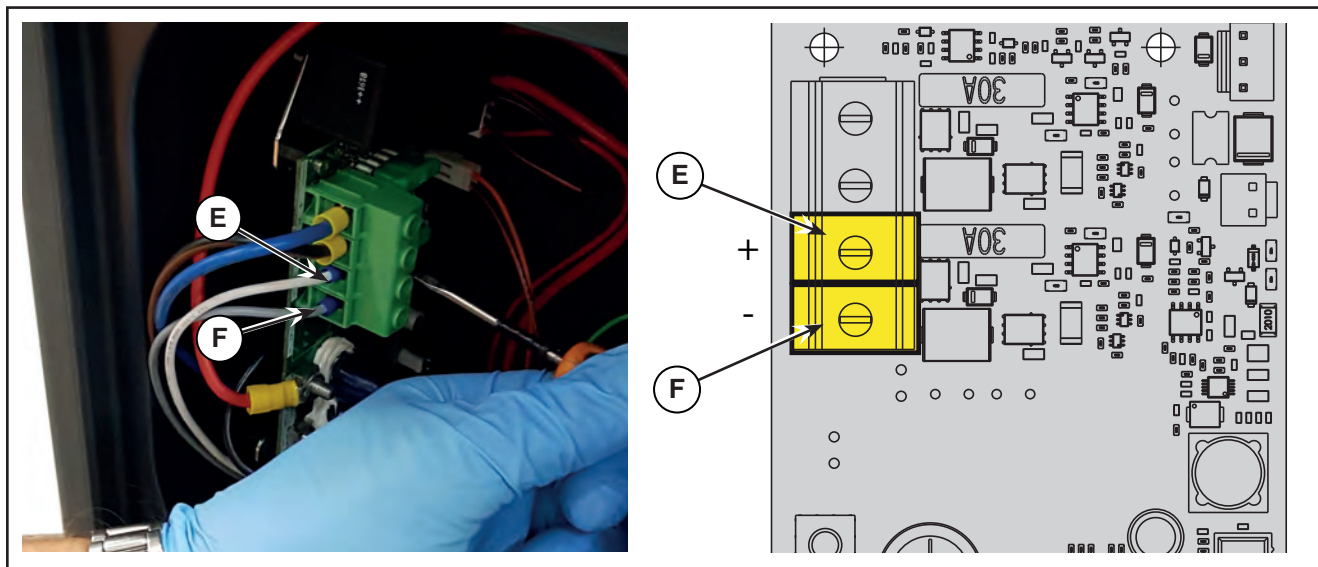


Figure 11:



## Main Machine Controller (EB1) (continues)

- (G) and (H) Brush motor connection (J303 OUT1).

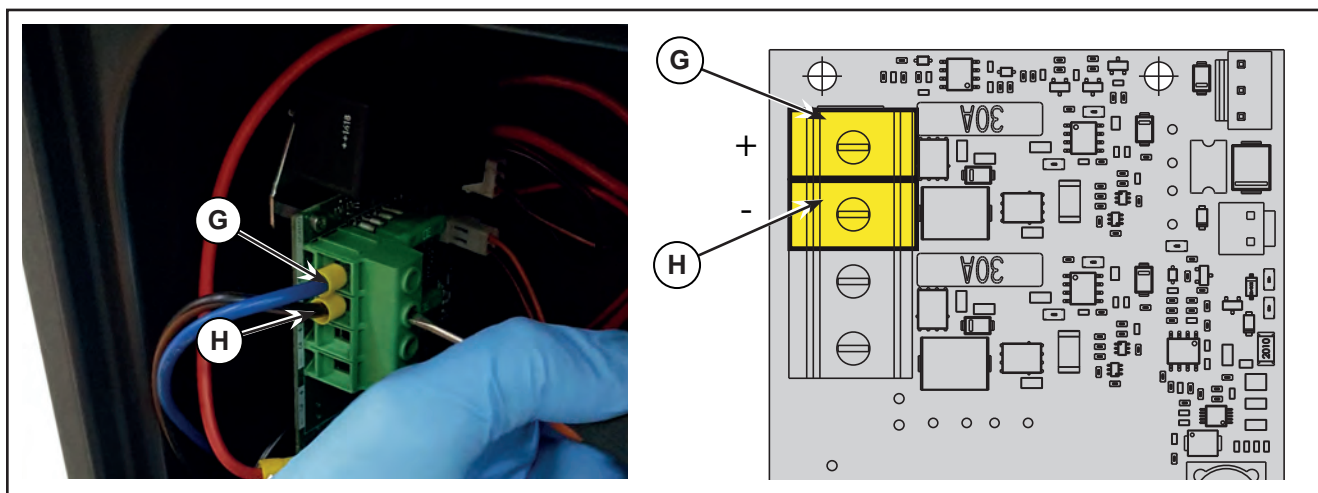


Figure 12:

- (I) Solenoid valve connection (J601 AUX1).

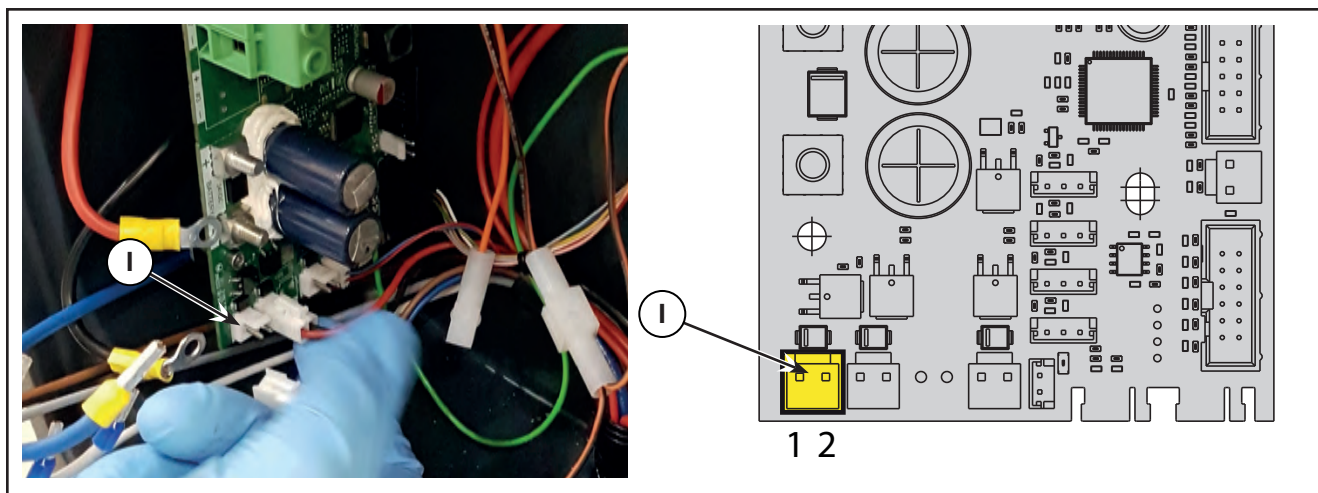


Figure 13:

- (J) Detergent pump connection (J602 AUX2).

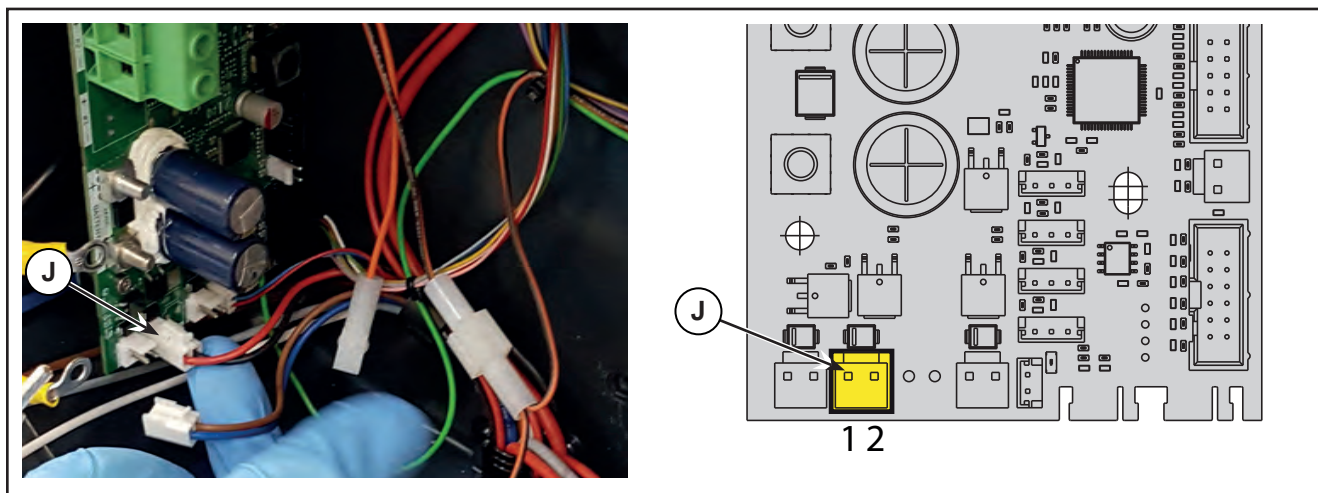


Figure 14:

### Main Machine Controller (EB1) (continues)

- (K) Hour meter connection (J604 AUX4).

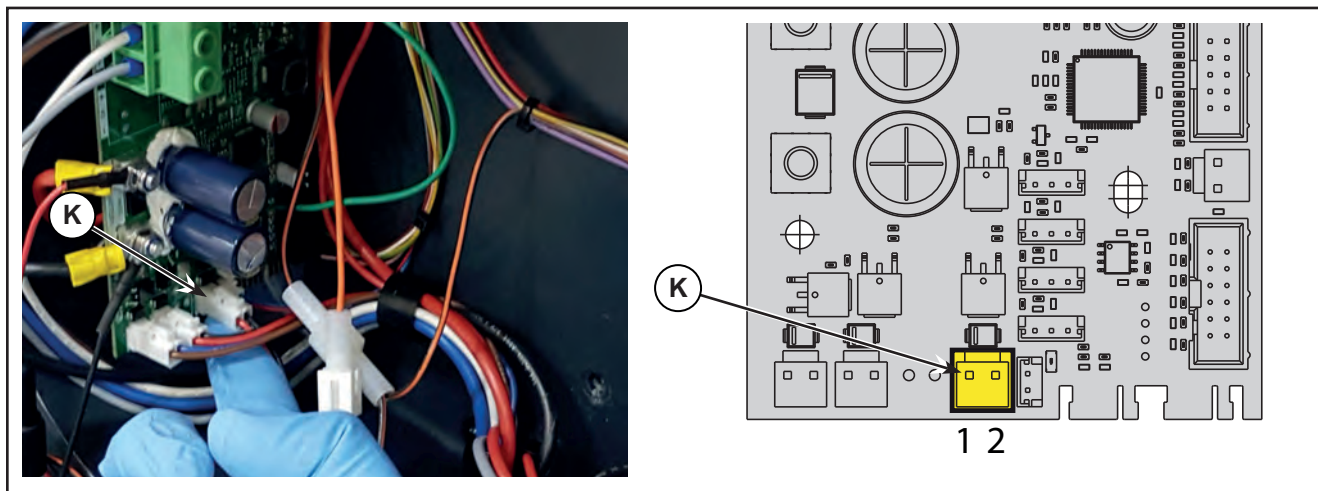


Figure 15:

- (L) User interface controller power connection (J105 BTN).

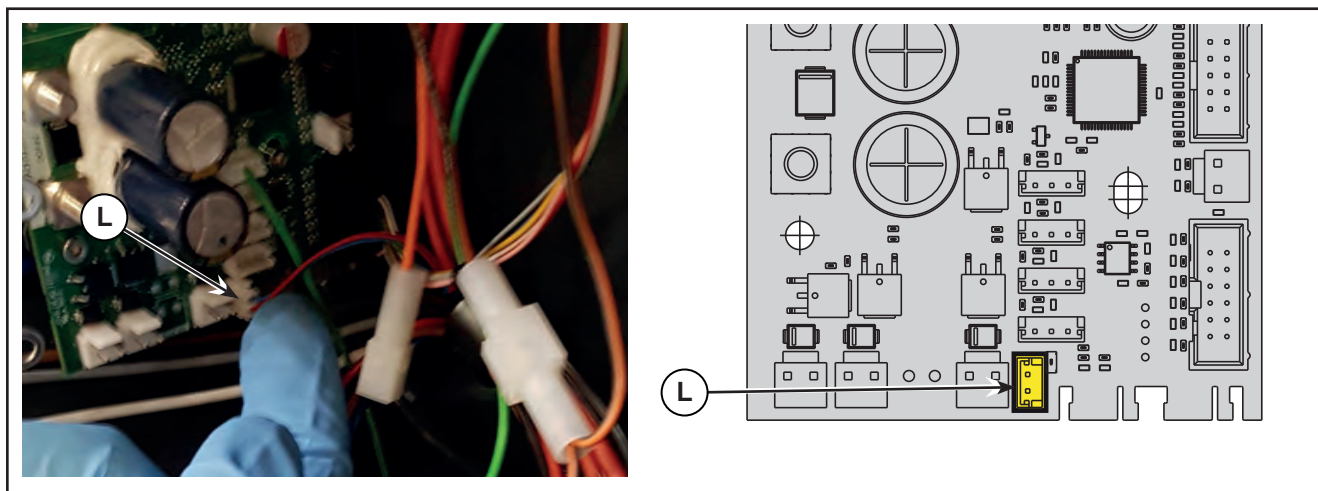


Figure 16:

- (M) User interface controller connection (J204 EXT).

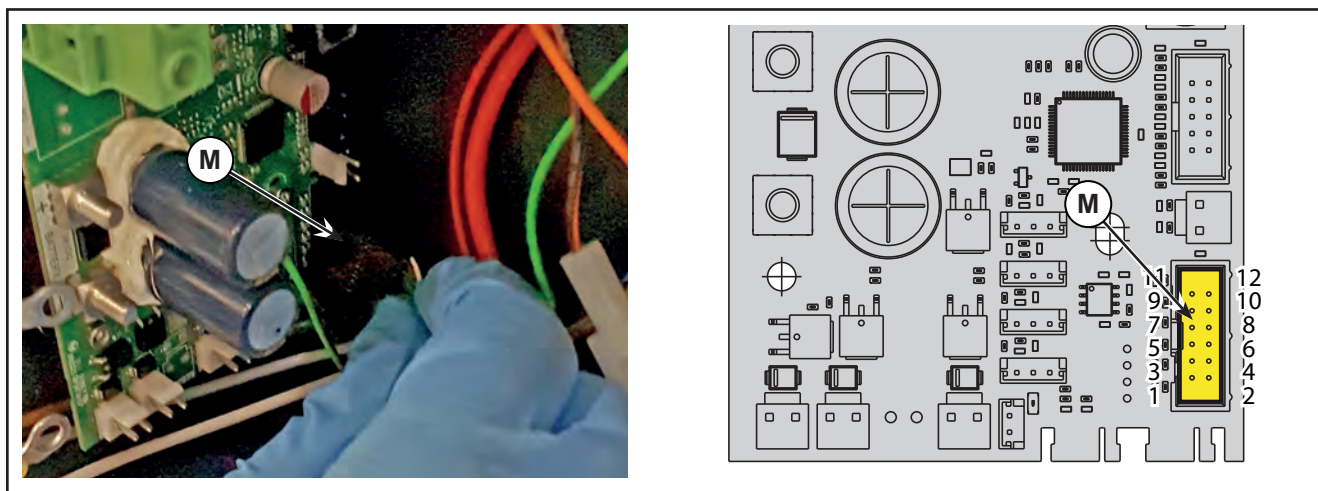


Figure 17:

### Main Machine Controller (EB1) (continues)

- (N) Drive wheels controller connection (JJ209 D4).

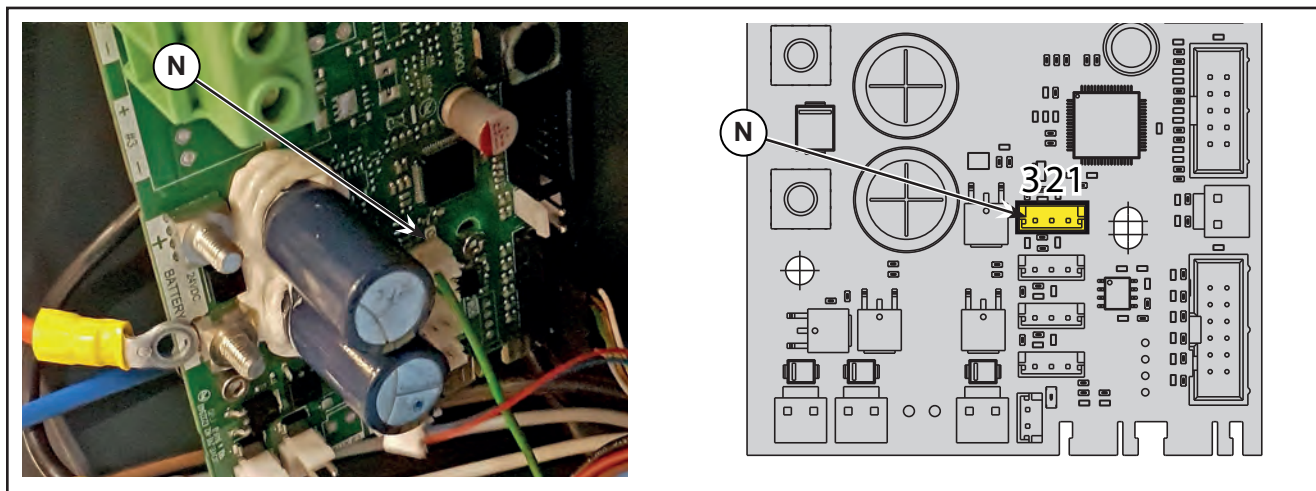


Figure 18:

- (O) Main machine controller connection (J104 BATTERY/RELAY).

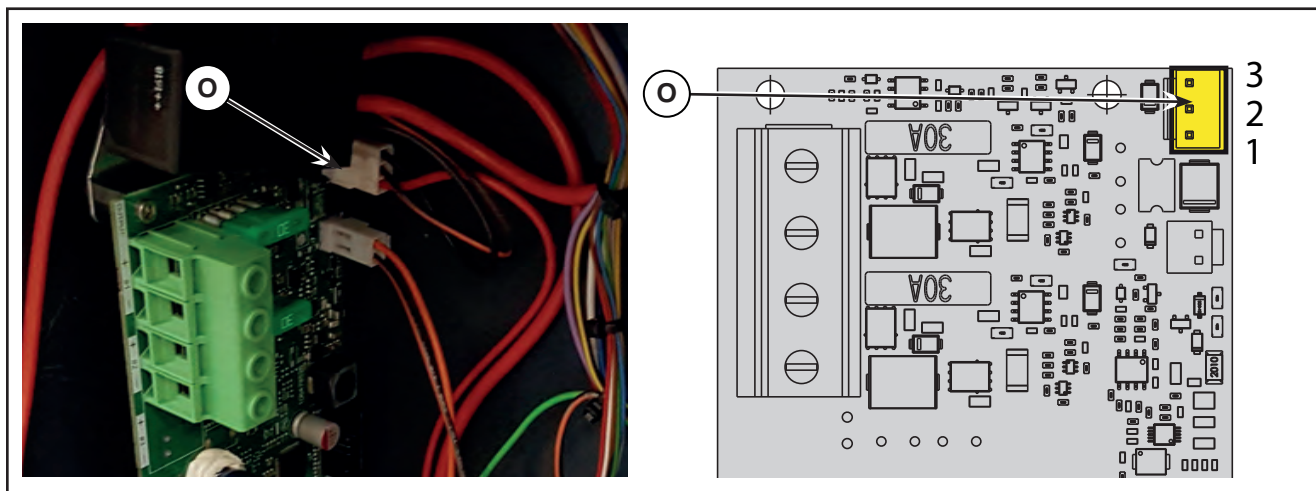


Figure 19:

- (P) Ignition key connection (J101 KEY).

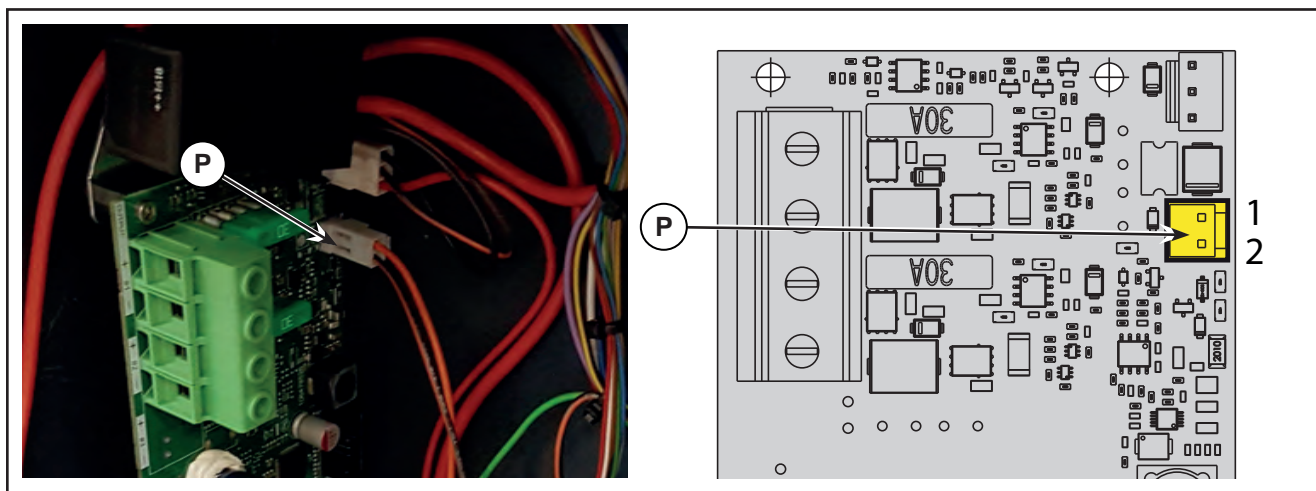


Figure 20:



**Main Machine Controller (EB1) (continues)**

5. Unscrew the 2 screws (Q) and pull out the Main machine controller (R) with his support bracket.
6. Unscrew the 4 screws (S) and carefully remove the Main machine controller (T).

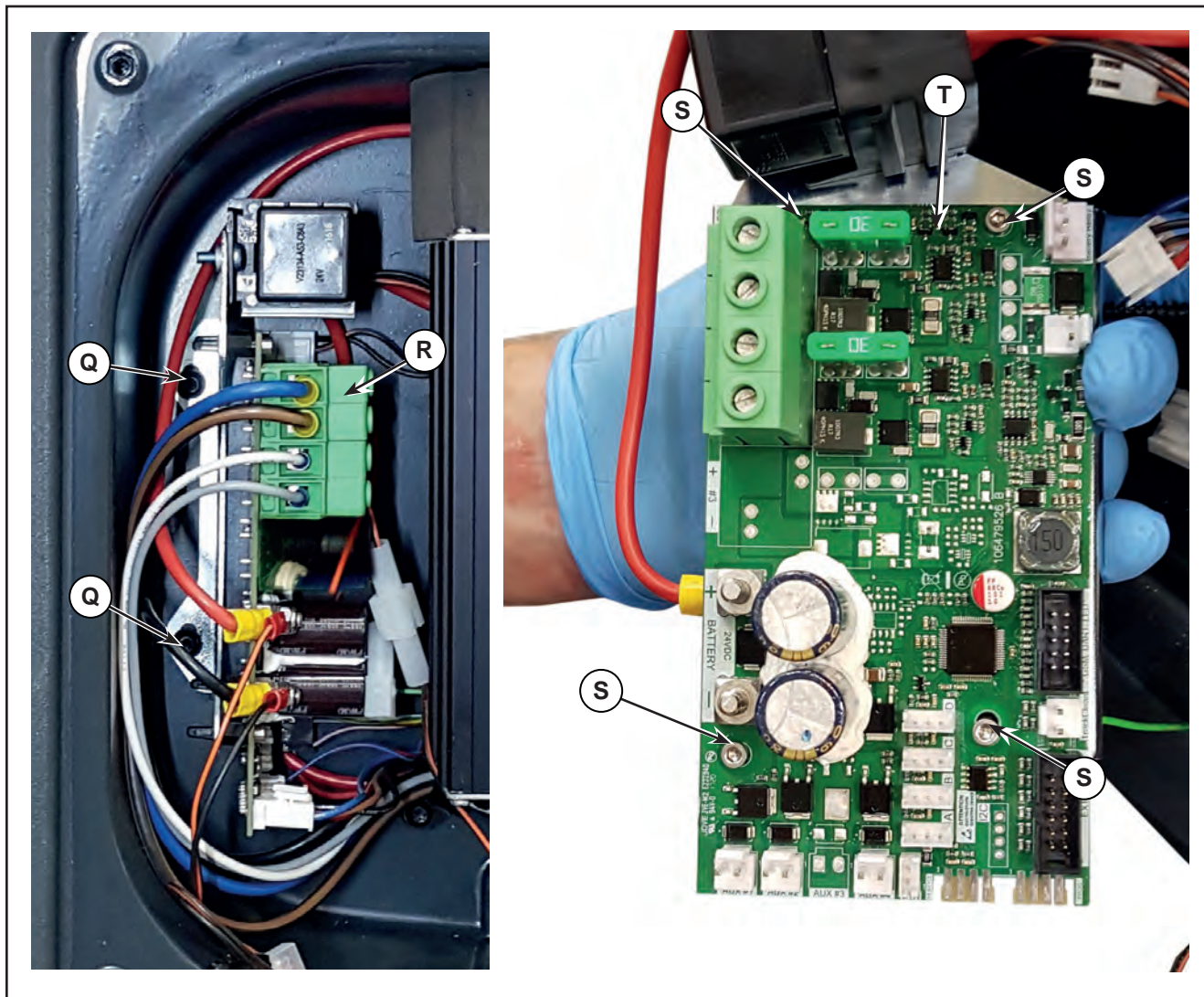


Figure 21:

7. Assemble the components in the reverse order of disassembly.



## User Interface Controller (EB2) and Operator's Presence Sensors (S1, S2)

### User Interface Controller (EB2)

1. If equipped remove the ignition key, then disconnect the red battery connector.
2. Unscrew the 2 screws (A) and open the user interface controller cover (B).
3. Disconnect the following connections:
  - (C) and (D), left and right Operator's presence sensors connection.
  - (E) User interface controller power supply connection (J201).
4. Carefully remove the User interface controller (F) detaching it from the cover (B).
5. Clean the cover area from the glue remained of the User interface controller removed.

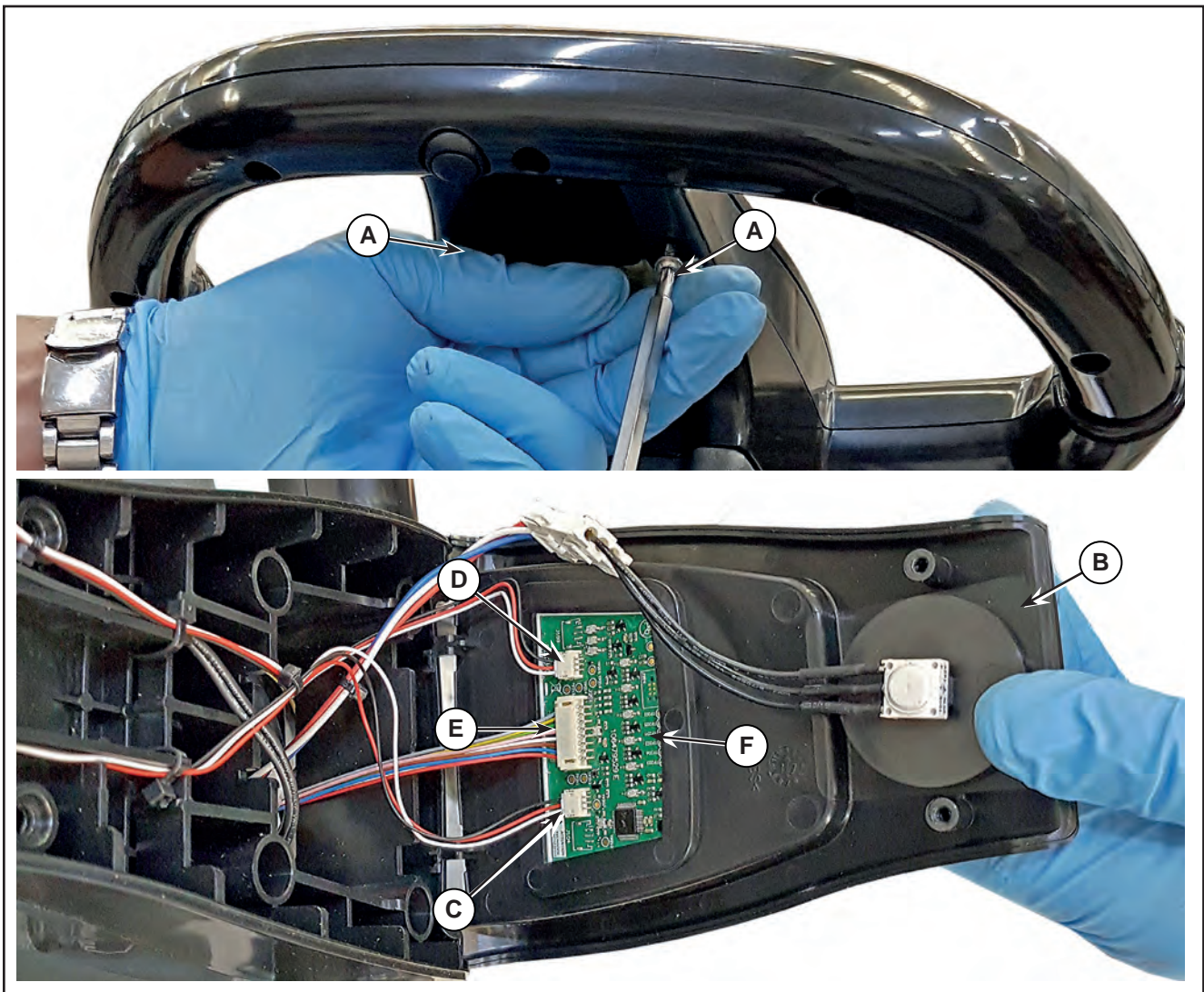


Figure 22:

6. Assemble the components in the reverse order of disassembly.



**Note:** The new User interface controller is provided with an self-adhesive seat for assembling.

### Operator's Presence Sensors (S1, S2)

1. After removing the user interface controller cover and its connections, unscrew the 4 screws (G) then remove the handlebar (H).
2. At the workbench, unscrew the 7 screws (I) to open the two handlebar parts front and back.
3. Disconnect the connection (J), with the screwdriver carefully remove the operator's presence sensor (K) detaching it from the support.
4. Clean the support area from the glue remained of the operator's presence sensor removed.

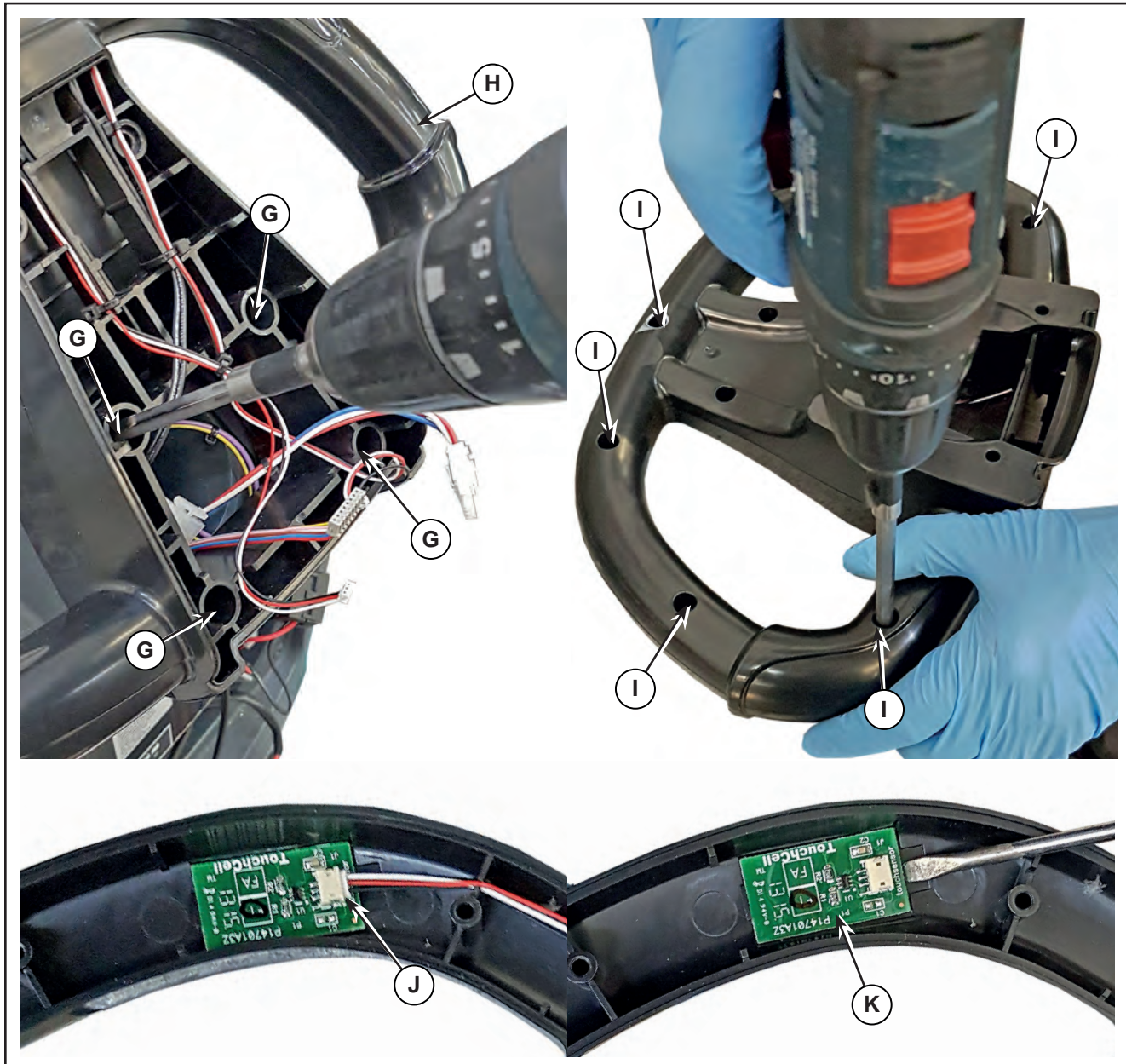


Figure 23:

5. Assemble the components in the reverse order of disassembly.



**Note:** The new operator's presence sensor is provided with an self-adhesive seat for assembling.

Specifications

Main Machine Controller (EB1) Connectors

J106, J107 BATTERY: bolt M5					
PIN	Description	Controller in/out	V ref.	I max.	Connected to
+	Vbatt +	In	24V	35A	BAT+
-	Vbatt -	In	0V	35A	BAT-

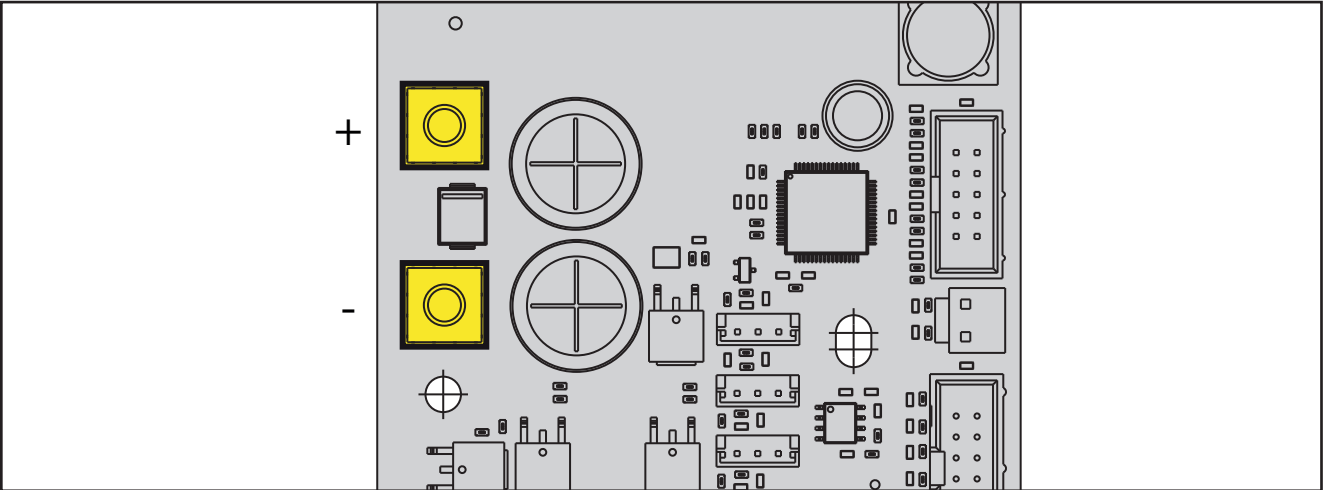


Figure 24:

J303 OUT1: type FCI T702035100J0G (2 ways, screw type)					
PIN	Description	Controller in/out	V ref.	I max.	Connected to
1	Brush output +	Out	24V	20A	M1+
2	Brush output -	Out	0V	20A	M1-

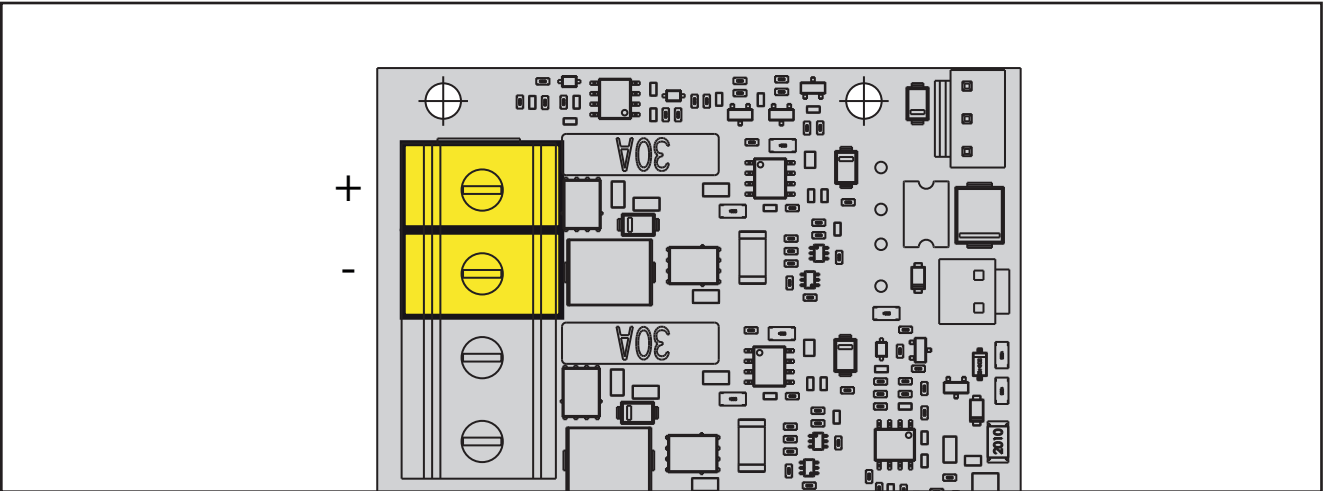


Figure 25:



**Main Machine Controller (EB1) Connectors (continues)****J403 OUT2: type FCI T702035100J0G (2 ways, screw type)**

PIN	Description	Controller in/out	V ref.	I max.	Connected to
1	Vacuum output +	Out	24V	15A	M2+
2	Vacuum output -	Out	0V	15A	M2-

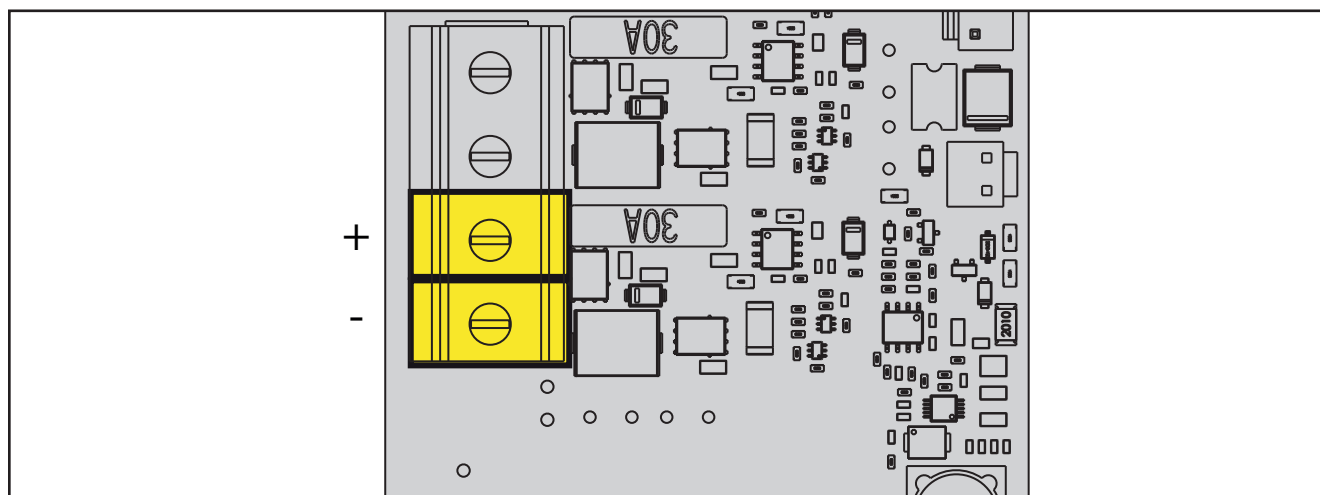


Figure 26:

**J601 AUX1: type JST B2P-VH (2 ways, vertical)**

PIN	Description	Controller in/out	V ref.	I max.	Connected to
1	Solenoid valve output +	Out	24V	1A	EV+
2	Solenoid valve output -	Out	0V	1A	EV-

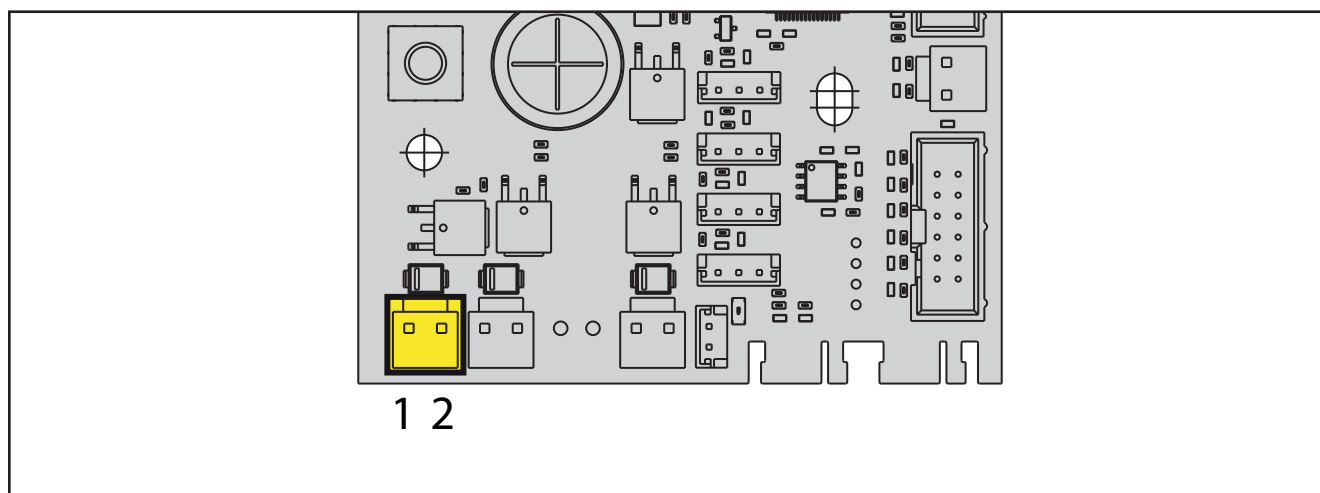
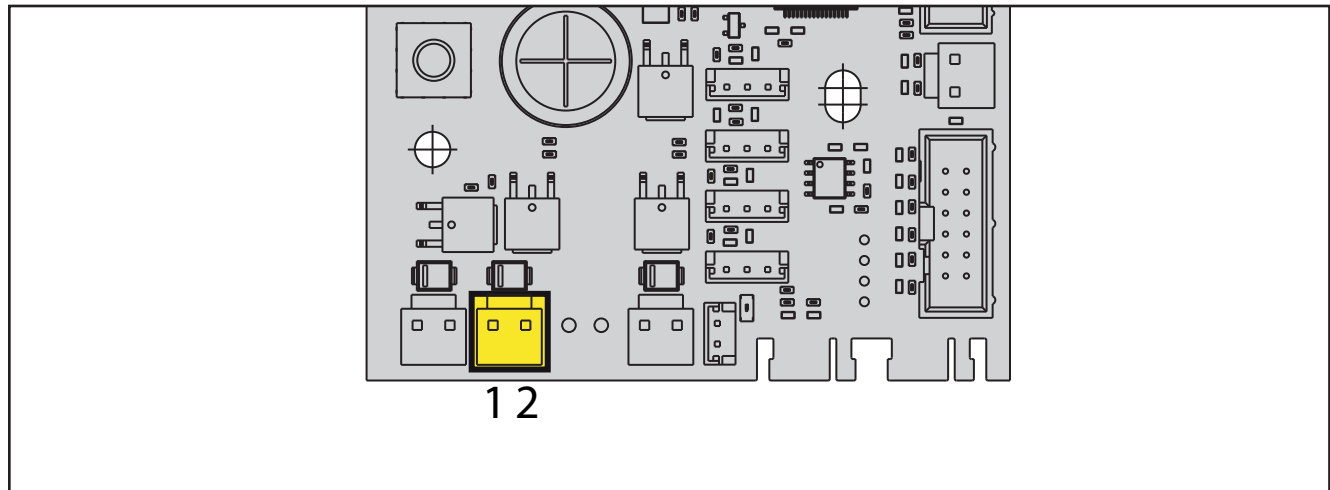


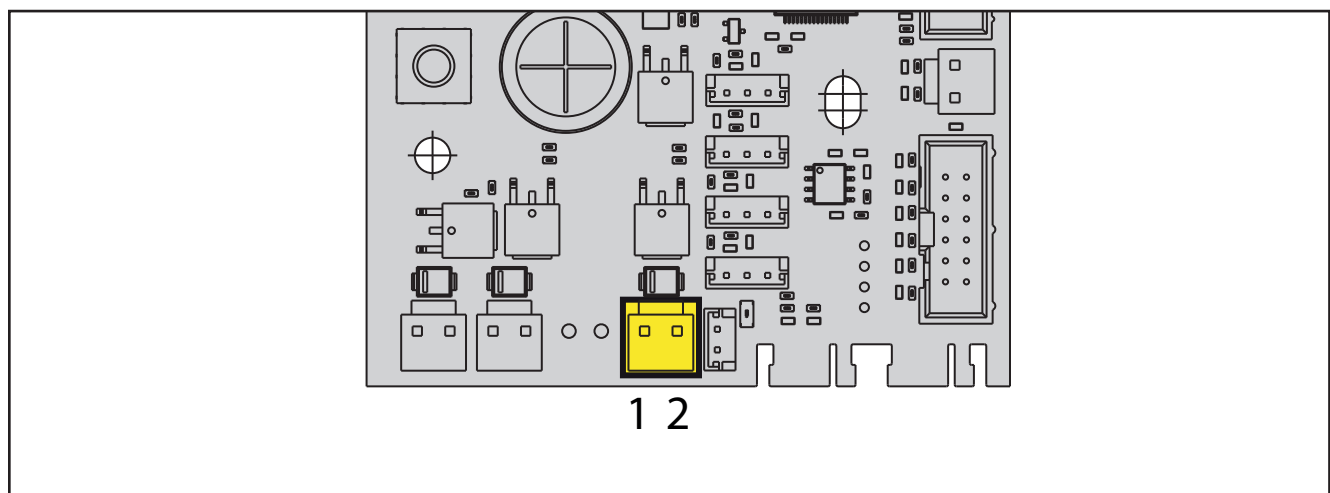
Figure 27:

**Main Machine Controller (EB1) Connectors (continues)****J602 AUX2: type JST B2P-VH (2 ways, vertical)**

PIN	Description	Controller in/out	V ref.	I max.	Connected to
1	Detergent pump output +	Out	24V	1A	PM+
2	Detergent pump output -	Out	0V	1A	PM-

**Figure 28:****J604 AUX4: type JST B2P-VH (2 ways, vertical)**

PIN	Description	Controller in/out	V ref.	I max.	Connected to
1	Hourmeter output +	Out	24V	<1A	HM+
2	Hourmeter output -	Out	0V	<1A	HM-

**Figure 29:**



**Main Machine Controller (EB1) Connectors (continues)**

J204 EXT: LEOCO 3675P12VTA0 (12 ways, vertical)					
PIN	Description	Controller in/out	V ref.	I max.	Connected to
1	Power supply +	Out	5V	<1A	UI.J201.6
2	Power supply -	Out	0V	<1A	UI.J201.5
3	SPI MISO	In-out	0-5V	<1A	UI.J201.3
4	SPI MOSI	In-out	0-5V	<1A	UI.J201.2
5	-	-	-	-	-
6	SPI clock	Out	0-5V	<1A	UI.J201.1
7	-	-	-	-	-
8	-	-	-	-	-
9	-	-	-	-	-
10	-	-	-	-	-
11	SPI CS3	Out	0-5V	<1A	UI.J201.4
12	-	-	-	-	-

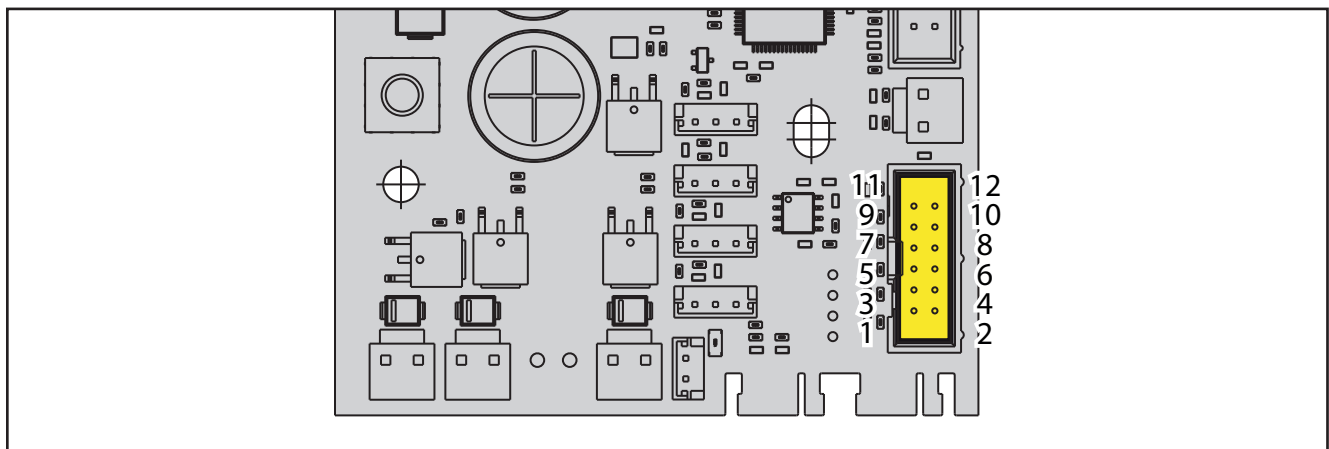


Figure 30:

Main Machine Controller (EB1) Connectors (continues)

J105 BTN: JST B2B-EH-A (2 ways, vertical)					
PIN	Description	Controller in/out	V ref.	I max.	Connected to
1	Power button output	Out	24V	<1A	UI.J201.8
2	Power button input	In	24V	<1A	UI.J201.7

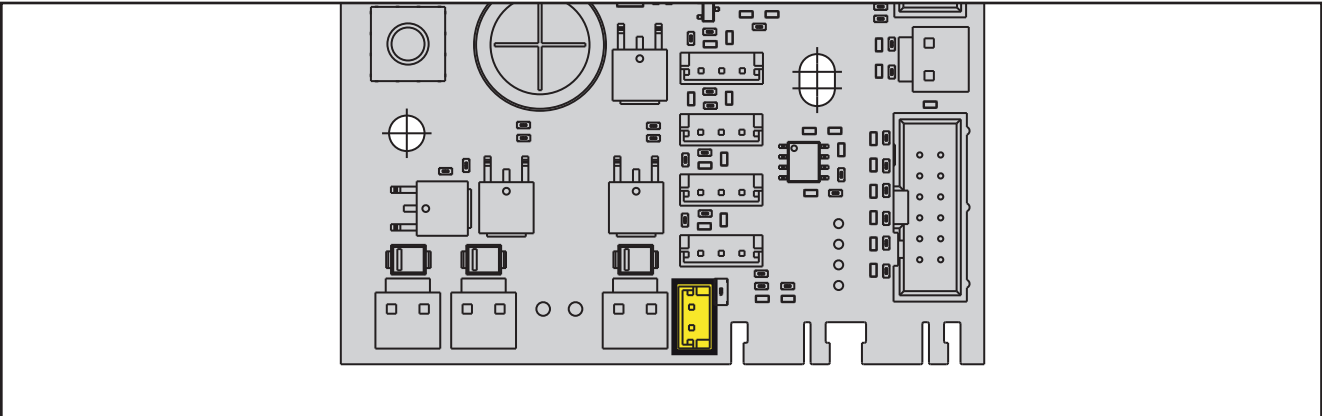


Figure 31:

J101 KEY: JST B2P-VH (2 ways, vertical)					
PIN	Description	Controller in/out	V ref.	I max.	Connected to
1	Key output	Out	24V	1A	K1, CH.3
2	Key input	In	24V	1A	CH.4, K1

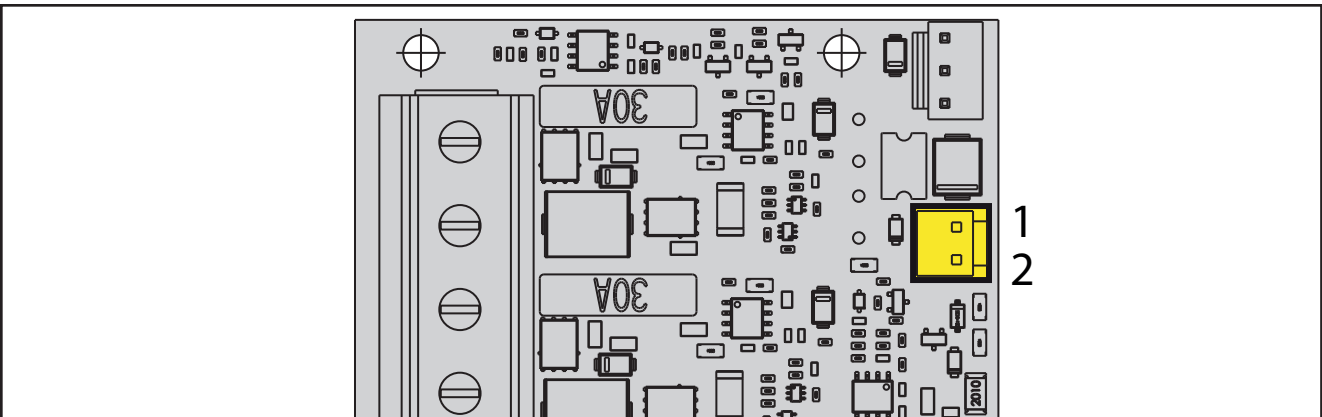
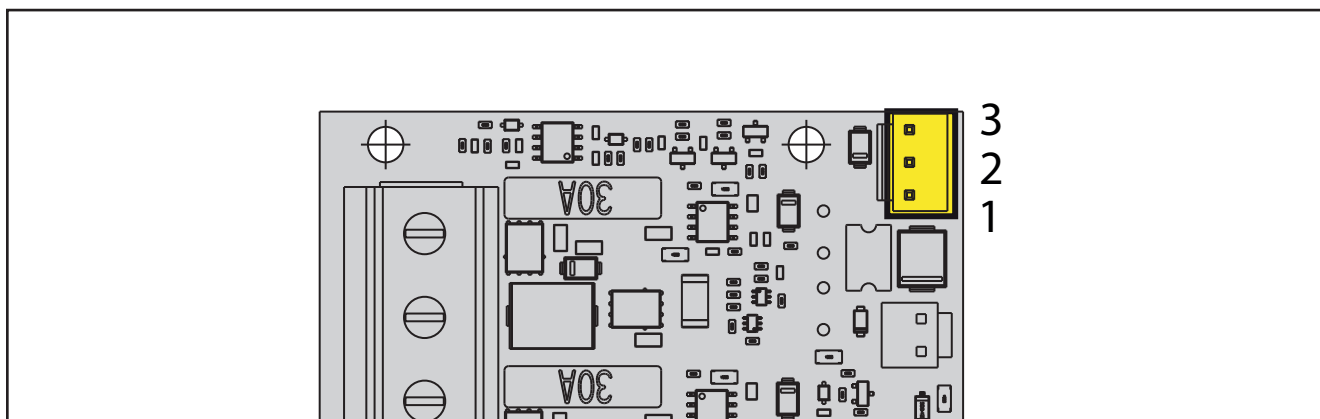


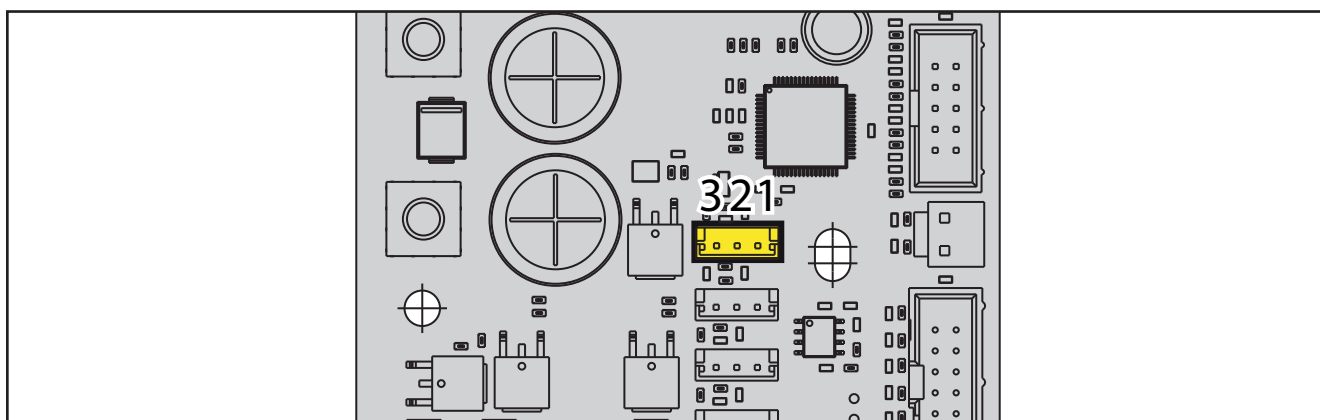
Figure 32:

**Main Machine Controller (EB1) Connectors (continues)****J104 BATTERY/RELAY: JST B3P-VH (3 ways, vertical)**

PIN	Description	Controller in/out	V ref.	I max.	Connected to
1	Power supply + (permanent)	In	24V	1A	BAT
2	Power relay +	Out	24V	<1A	ES1.86
3	Power relay -	Out	0V	<1A	ES1.85

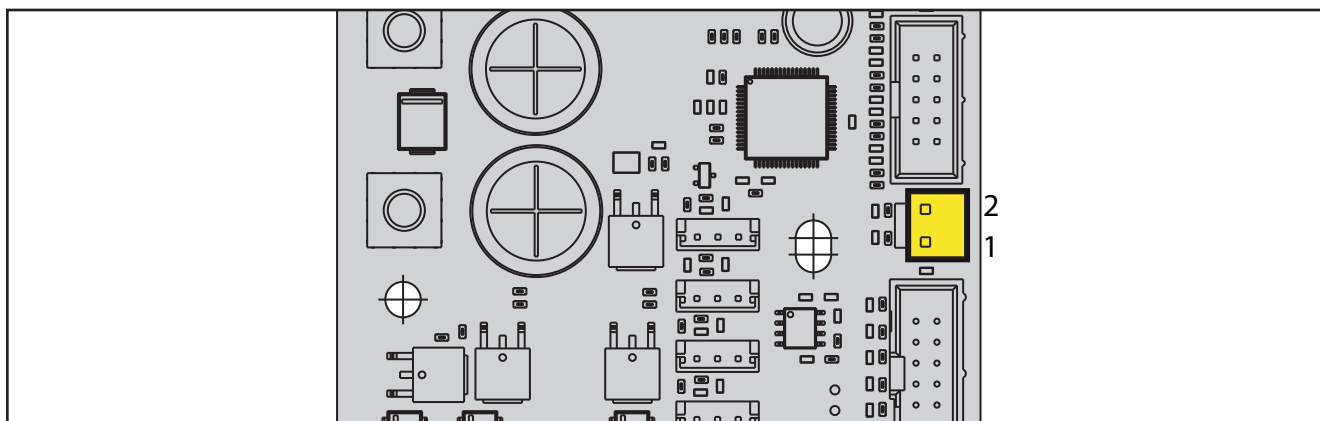
**Figure 33:****J209 D: type JST B3B-EH-A (3 ways, vertical)**

PIN	Description	Controller in/out	V ref.	I max.	Connected to
1	-	-	-	-	-
2	Drive system enable output	Out	5V	<1A	EB3.J1.12
3	-	-	-	-	-

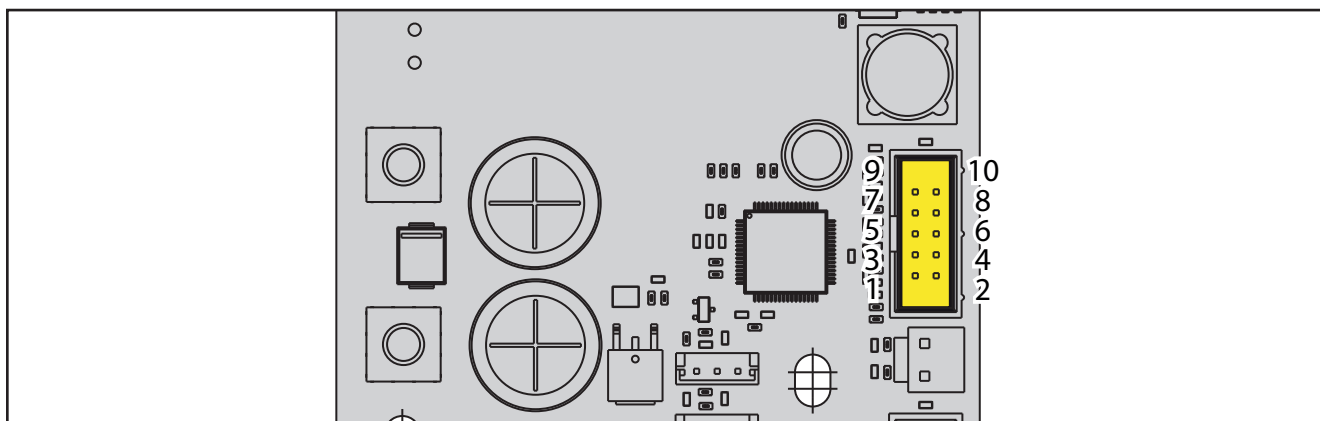
**Figure 34:**

**Main Machine Controller (EB1) Connectors (continues)****J108 TRACKCLEAN POWER JST B2P-VH (2 ways, vertical)**

PIN	Description	Controller in/out	V ref.	I max.	Connected to
1	Supply 0V (permanent)	out	0V	<1A	TRK.BU
2	Supply +24V (permanent)	out	24V	<1A	TRK.RD

**Figure 35:****J203 GSM/UART/LED: LEOCO 3675P10VTA0 (10 ways, vertical)**

PIN	Description	Controller in/out	V ref.	I max.	Connected to
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-
5	Output Machine turned on	out	5V	<1A	TRK.BN
6	Output Brush turned on	out	0V	<1A	TRK.WH
7	Output Vacuum turned on	out	5V	<1A	TRK.GY
8	-	-	-	-	-
9	Output Drive turned on	out	5V	<1A	TRK.PK
10	Input iButton	in	0V	<1A	TRK.YE

**Figure 36:**

## User Interface Controller (EB2) Connectors

**J201: SJT S8B-PH-SM4-TB (8 ways, vertical)**

PIN	Description	Controller in/out	V ref.	I max.	Connected to
1	SPI clock	In	0-5V	<1A	EXT.6
2	SPI MOSI	In-out	0-5V	<1A	EXT.4
3	SPI MISO	In-out	0-5V	<1A	EXT.3
4	SPI CS3	In	0-5V	<1A	EXT.11
5	Power supply -	In	0V	<1A	EXT.2
6	Power supply +	In	5V	<1A	EXT.1
7	Power button output	Out	24V	1A	BUTTON.2
8	Power button input	In	24V	1A	BUTTON.1

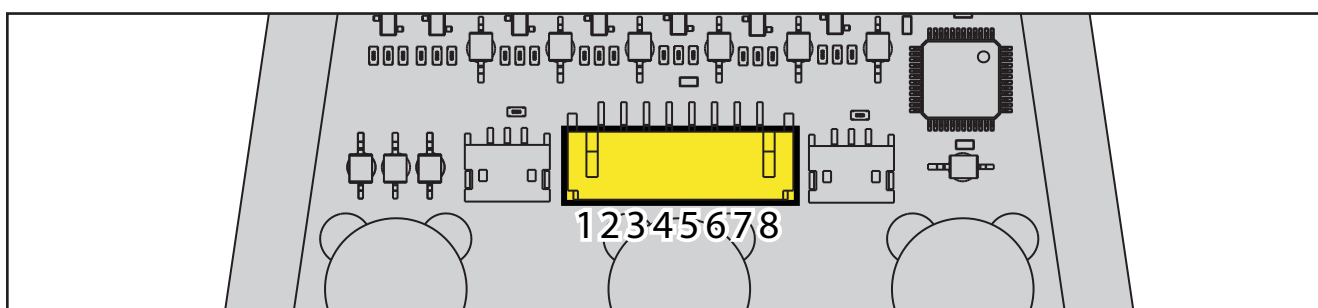


Figure 37:

**LEFT: JST S3B-ZR-SM4A-TF (3 ways, side entry)**

PIN	Description	Controller in/out	V ref.	I max.	Connected to
1	Left operator presence sensor supply -	out	0V	<1A	S1.1
2	Left operator presence sensor supply +	out	5V	<1A	S1.2
3	Left operator presence sensor input	In	0V	<1A	S1.3

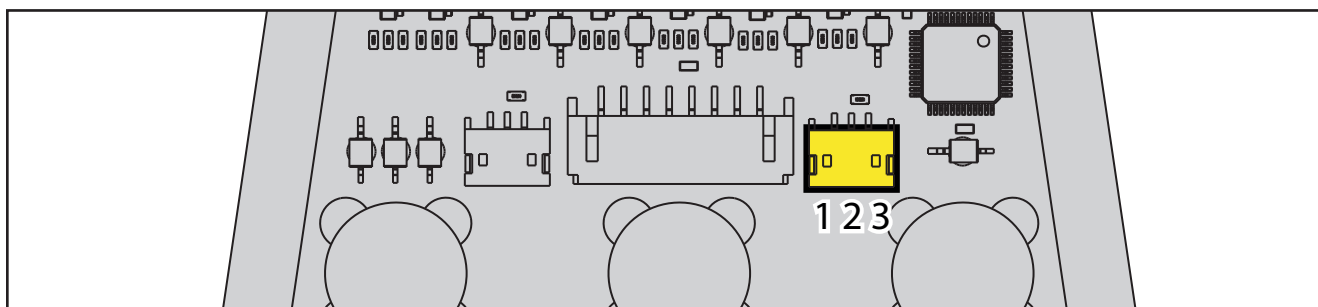


Figure 38:



User Interface Controller (EB2) Connectors (continues)

RIGHT: JST S3B-ZR-SM4A-TF (3 ways, side entry)					
PIN	Description	Controller in/out	V ref.	I max.	Connected to
1	Right operator presence sensor supply -	out	0V	<1A	S2.1
2	Right operator presence sensor supply +	out	5V	<1A	S2.2
3	Right operator presence sensor input	In	0V	<1A	S2.3

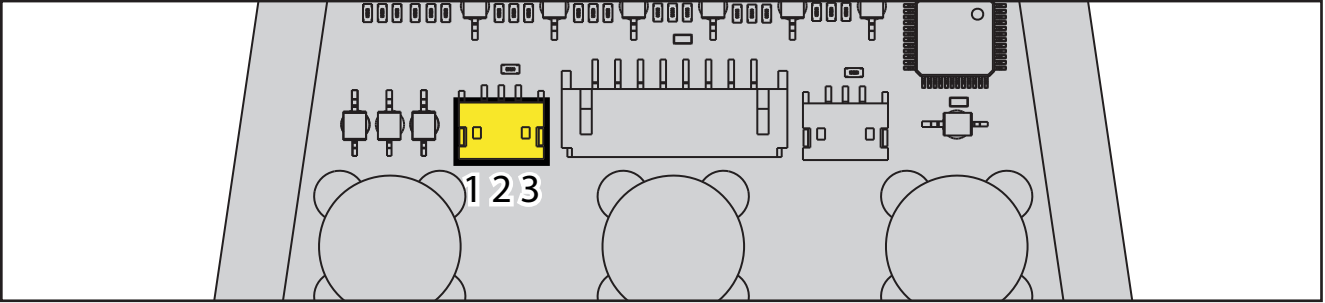


Figure 39:

## Shop Measurements

The following tables contain some “real world” shop voltage measurements to help you recognize what “normal” looks like. All voltage values were measured with the black (Negative) voltmeter lead connected to the main battery negative unless otherwise specified.

### Main Machine Controller (EB1)

Battery volts at battery, key on = 24.24V

#### Power Supply

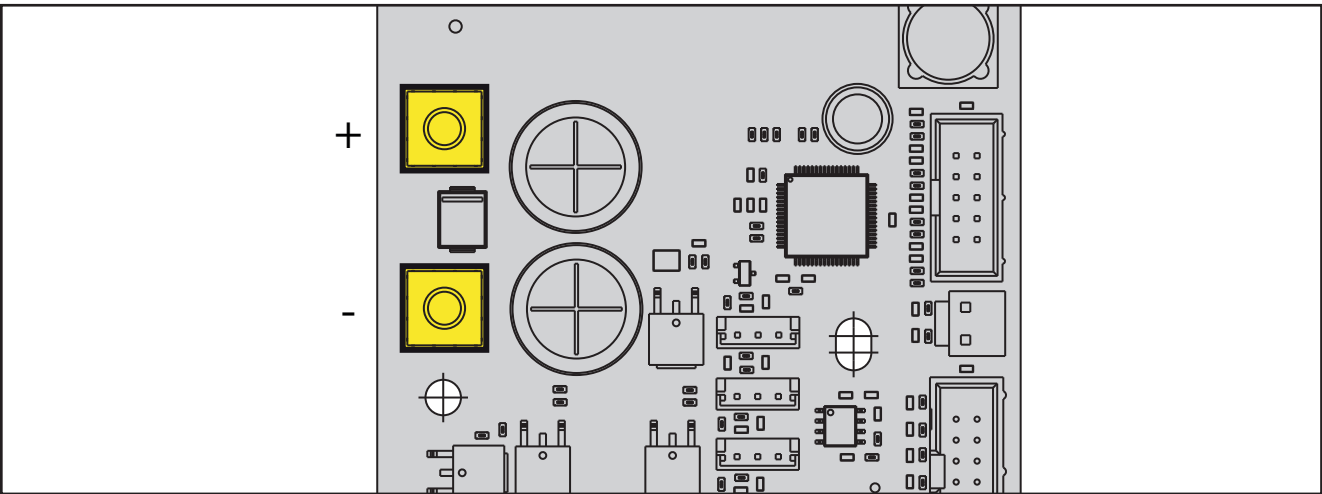


Figure 40:

PIN	Color	Description	Measured	Comments
B+	Red	Main machine controller power supply +	23.83 V	Vac ON
B-	Black	Main machine controller power supply -	0.039 V	Vac ON

## Main Machine Controller (EB1) (continues)

### Brush Motor

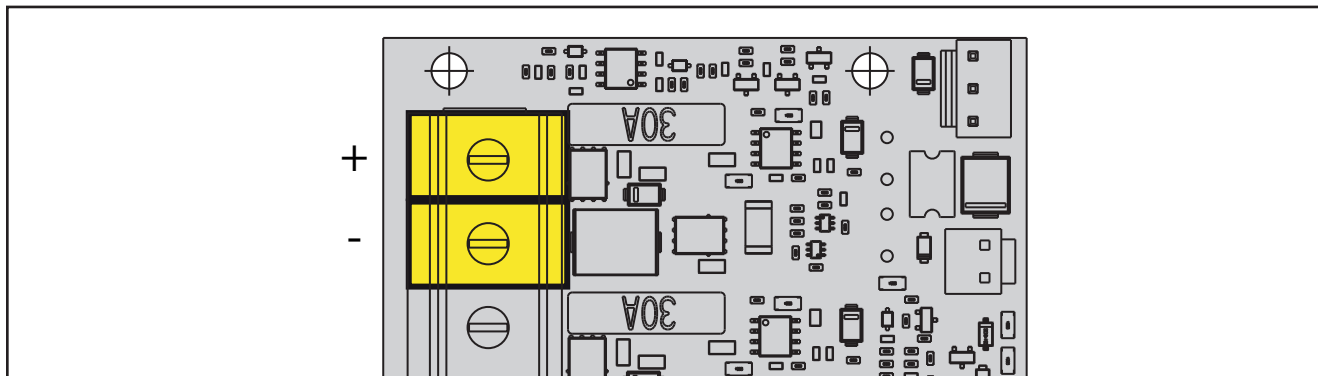


Figure 41:

PIN	Color	Description	Measured	Comments
1	Blue	Brush motor +	24.14 (OFF)	
			23.79 (ON)	
2	Brown	Brush motor -	24.14 (OFF)	
			3.81 (ON)	

### Vacuum System Motor

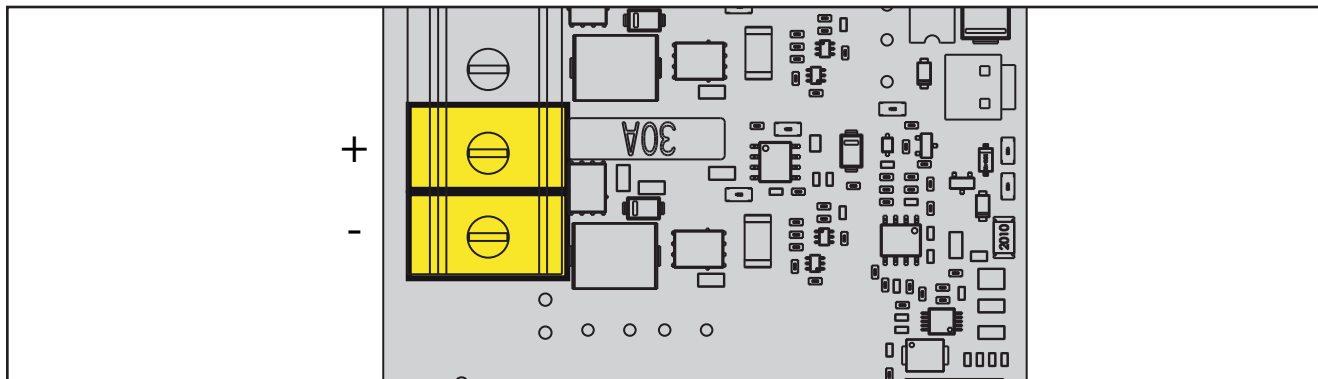


Figure 42:

PIN	Color	Circuit Description	Measured	Comments
1	White	Vacuum system motor +	23.78 V (SILENT)	
			23.6 V (ON)	
			24.12 (OFF)	
2	Yellow	Vacuum system motor -	7.39 V (SILENT)	
			0.074 V (ON)	
			24.12 V (OFF)	

## Main Machine Controller (EB1) (continues)

### Solenoid Valve

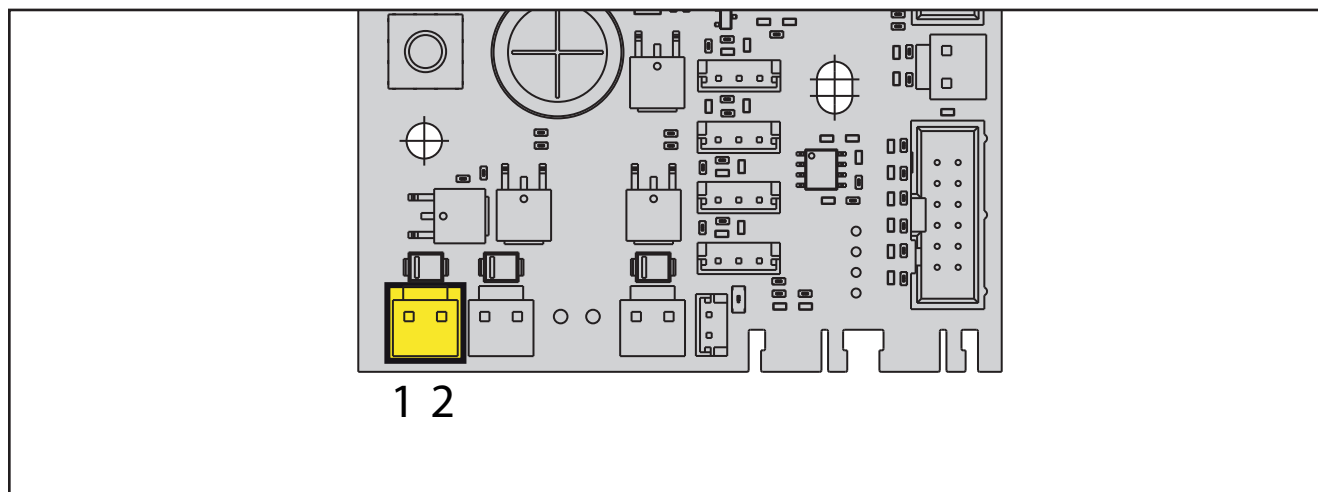


Figure 43:

PIN	Color	Description	Measured	Comments
1	Blue	Solenoid valve power supply +	23.56 V	All levels
2	Brown	Solenoid valve power supply -	0.070 V	Max level

### Detergent Pump

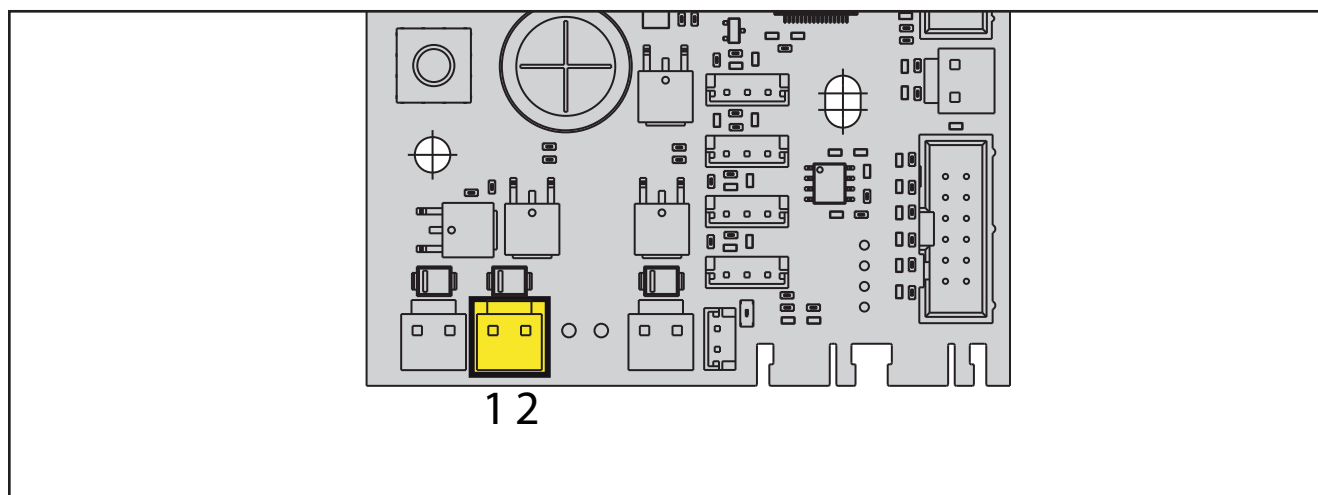


Figure 44:

PIN	Color	Description	Measured	Comments
1	Red	Detergent pump power supply +	23.51 V	All levels
2	Black	Detergent pump power supply -	0.052 V	Max level

Main Machine Controller (EB1) (continues)

Hourmeter

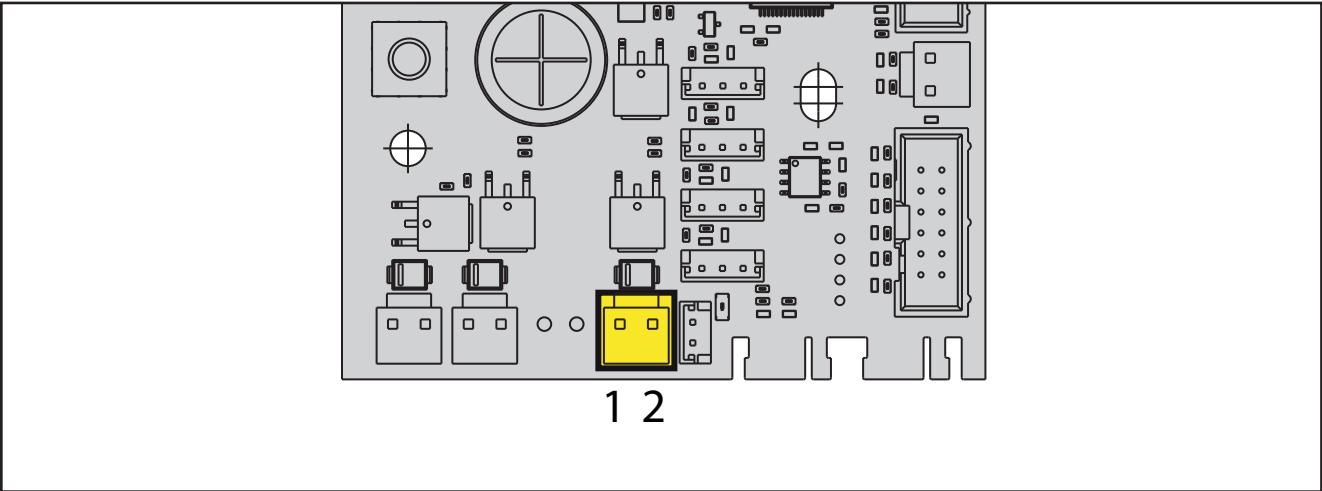


Figure 45:

PIN	Color	Circuit Description	Measured	Comments
1	Red	Hourmeter power supply +	23.47 V	
2	Black	Hourmeter power supply -	0.047 V	With drive enable

User Interface Controller

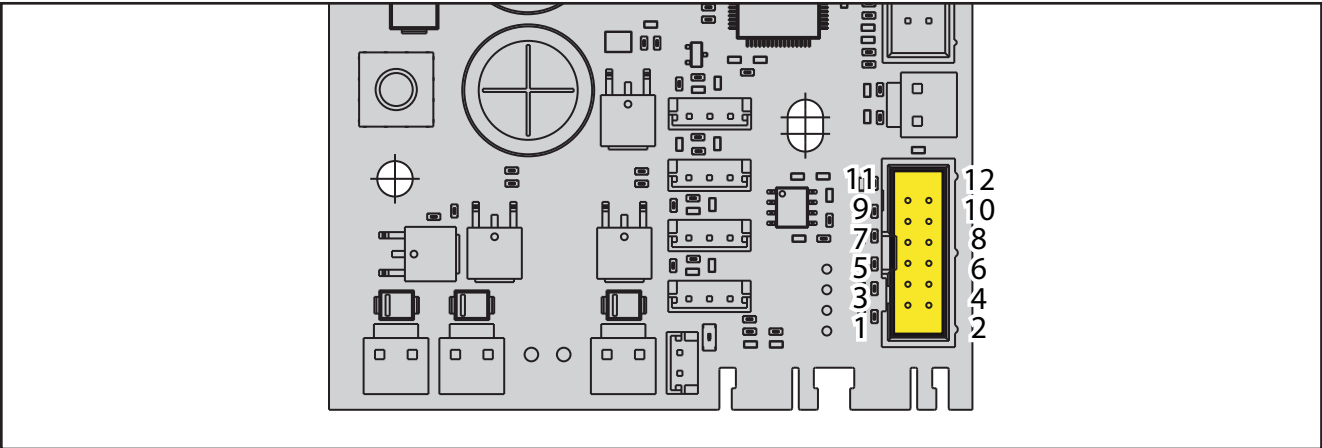


Figure 46:

PIN	Color	Circuit Description	Measured	Comments
1	Brown	Power supply +	5.1 V (Machine ON)	
2	White	Power supply -	0.00 V	
3	Green	SPI MISO	0 - 5 V	
4	Yellow	SPI MOSI	0 - 5 V	
6	Grey	SPI clock	0 - 5 V	
11	Pink	SPI CS3	0 - 5 V	



Main Machine Controller (EB1) (continues)

BTN

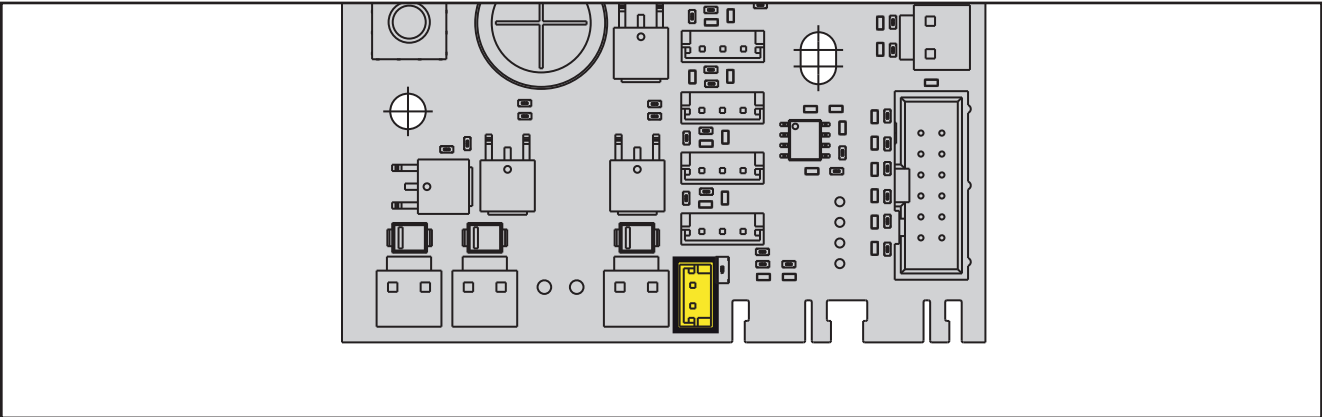


Figure 47:

PIN	Color	Circuit Description	Measured	Comments
1	Red	Power button output	23.84 V (OFF)	
			23.75 V (ON)	
2	Blue	Power button input	0.00 V (OFF)	
			23.84 V (While pressing Main button)	

Key

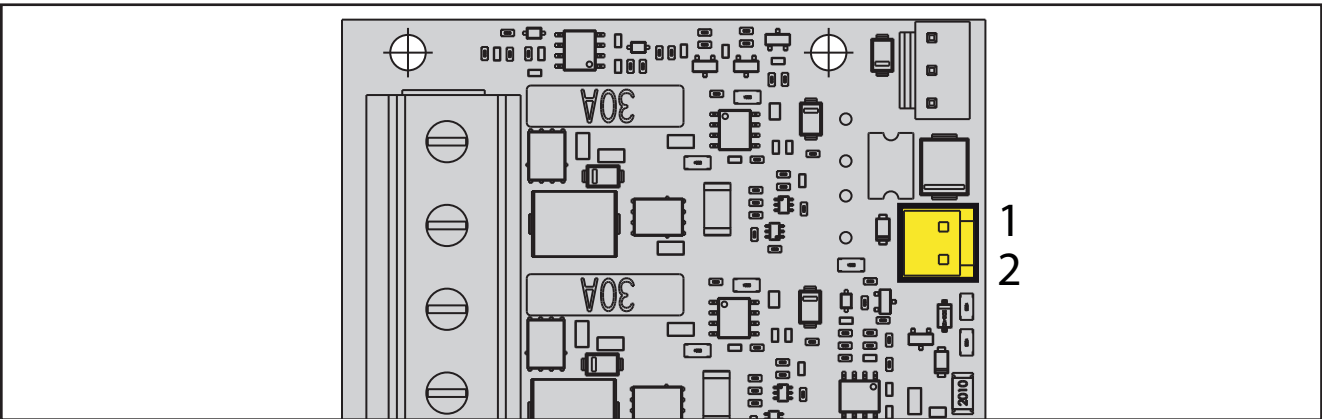


Figure 48:

PIN	Color	Circuit Description	Measured	Comments
1	Orange	Key output	23.84 V	Connected to PTC FUSE
2	Black/ Orange	Key input	23.74 V (ON)	
			0.01 V (OFF)	

Main Machine Controller (EB1) (continues)

Battery / Relay

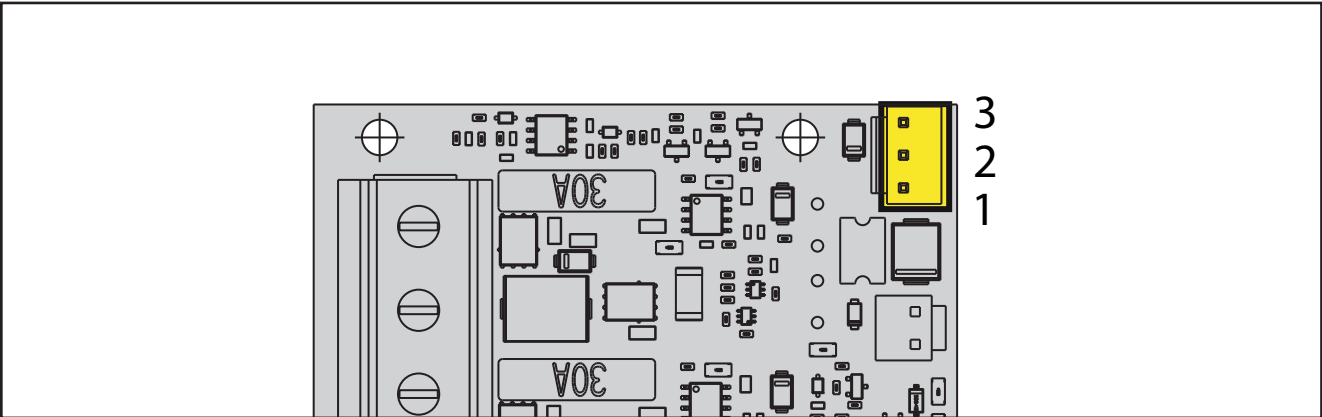


Figure 49:

PIN	Color	Circuit Description	Measured	Comments
1	Red	Power supply + (permanent)	24.18 V	Connected to B+
2	Black	Power relay +	23.8 V (OFF) 23.77 (ON)	Connected to PTC FUSE
3	Black/ Orange	Power relay -	24.09 V (OFF) 0.02 V (ON)	

D (Drive Enable)

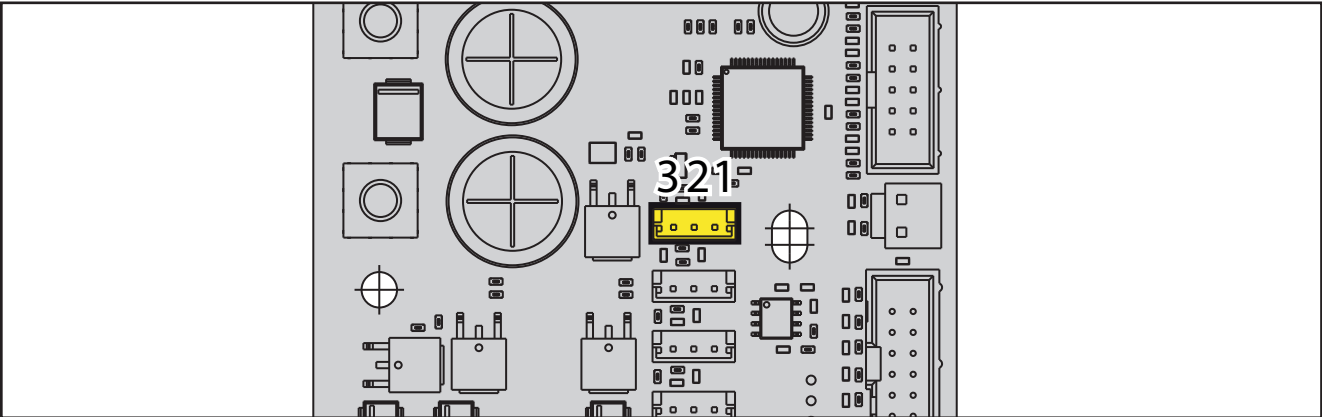


Figure 50:

PIN	Color	Circuit Description	Measured	Comments
2	Green	Drive system enable output	0.003 V (No Drive) 4.95 V (Drive)	

## User Interface Controller (EB2)

Measure and record the voltage at each of the Main machine controller pins. Always use battery negative as your reference point for your black voltmeter lead.

### J201

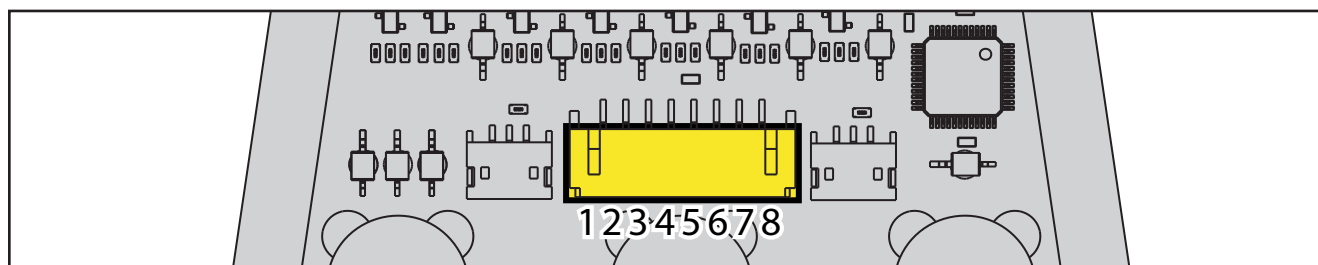


Figure 51:

PIN	Color	Circuit Description	Measured	Comments
1	Grey	SPI clock	0 - 5 V	
2	Yellow	SPI MOSI	0 - 5 V	
3	Green	SPI MISO	0 - 5 V	
4	Pink	SPI CS3	0 - 5 V	
5	White	Power supply -	0.00 V	
6	Brown	Power supply +	5.10 V (Machine ON)	
7	Blue	Power button output	23.85 V (While pressing Main button)	
8	Red	Power button input	23.85 V (Machine ON and OFF)	

### Left Operator's Presence Sensor

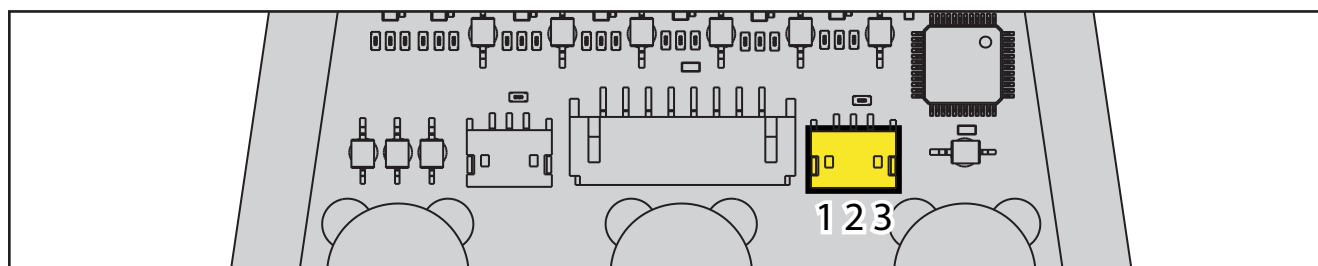


Figure 52:

PIN	Color	Circuit Description	Measured	Comments
1	Red	Left operator presence sensor supply -	0.03 V	Machine ON
2	Black	Left operator presence sensor supply +	5.10 V	Machine ON
3	White	Left operator presence sensor input	4.26 V (No operator)	
			0.09 V (With operator)	

User Interface Controller (EB2) (continues)

Right Operator's Presence Sensor

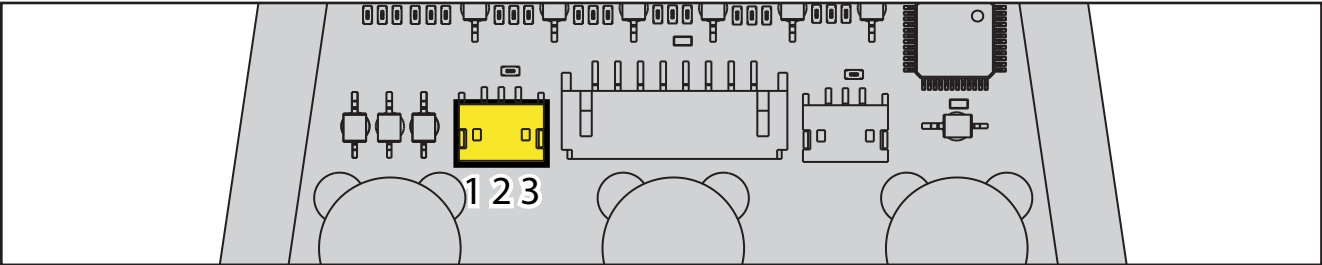


Figure 53:

PIN	Color	Circuit Description	Measured	Comments
1	Red	Right operator presence sensor supply -	0.03 V	Machine ON
2	Black	Right operator presence sensor supply +	5.10 V	Machine ON
3	White	Right operator presence sensor input	4.26 V (No operator)	
			0.09 V (With operator)	



## 05 - Control System - Cord

### Functional Description

The (electrical) functions of the machine and of the Main Machine Controller (EB1) are controlled via the handlebar with the 3 buttons on the User Interface Controller (EB2) and activation of the Operator Presence Sensors (S1, S2) inside the 2 handlebars (the position of these is indicated by the corresponding icons).

The Start switch (SW1) must be pressed to the I position to turn on the machine.

The machine is turned on and off by pressing the

Main machine button



By pressing the Main button again when the machine is running, the brushing (with the solution flow preset to level 1) and vacuum functions are turned on or off. The LEDs on the Main and Vacuum buttons show the related ON status.

Brush rotation and the activation of the pump, however, also require the activation of at least 1 of the 2 Operator presence sensors (S1, S2).



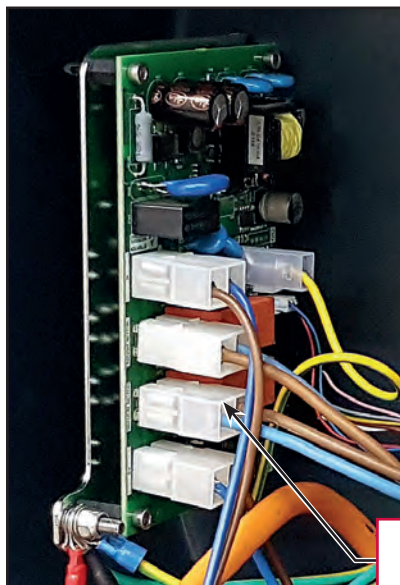
The vacuum function can be turned on or off independently from the brushing function, by

pressing the Vacuum system button



The solution flow can be increased to level 2, 3 or

else disabled, via the Solution button



Wiring Diagram

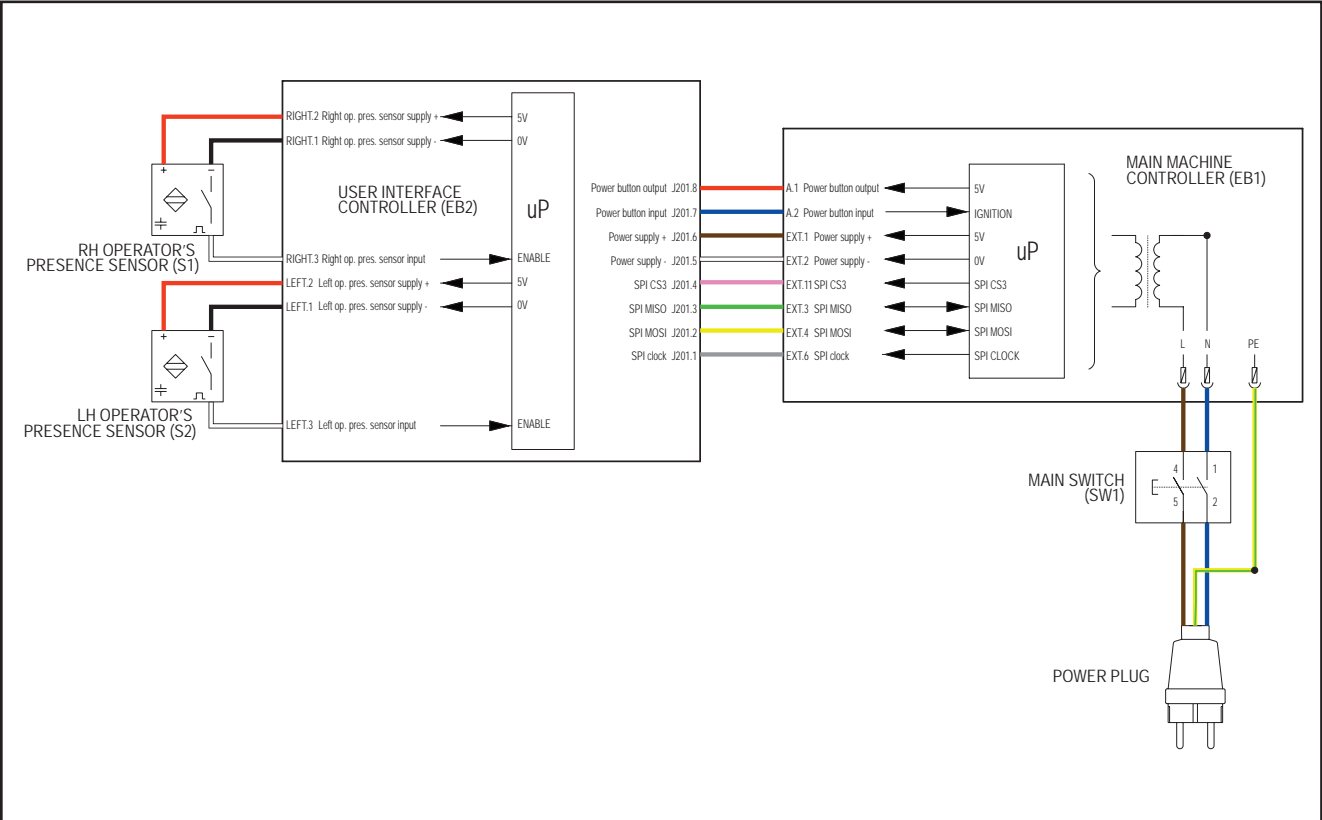


Figure 1:

## Component Locations



Figure 2:



## Maintenance and Adjustments

### Parameter Machine Settings

Parameters can be viewed by connecting the NEO Service Tool module, P/N 101221030 (A) to the Main Machine Controller (EB1) (B).

1. If equipped remove the ignition key, then disconnect the red battery connector.
2. Unscrew the 4 screws and remove the electronic component compartment cover.

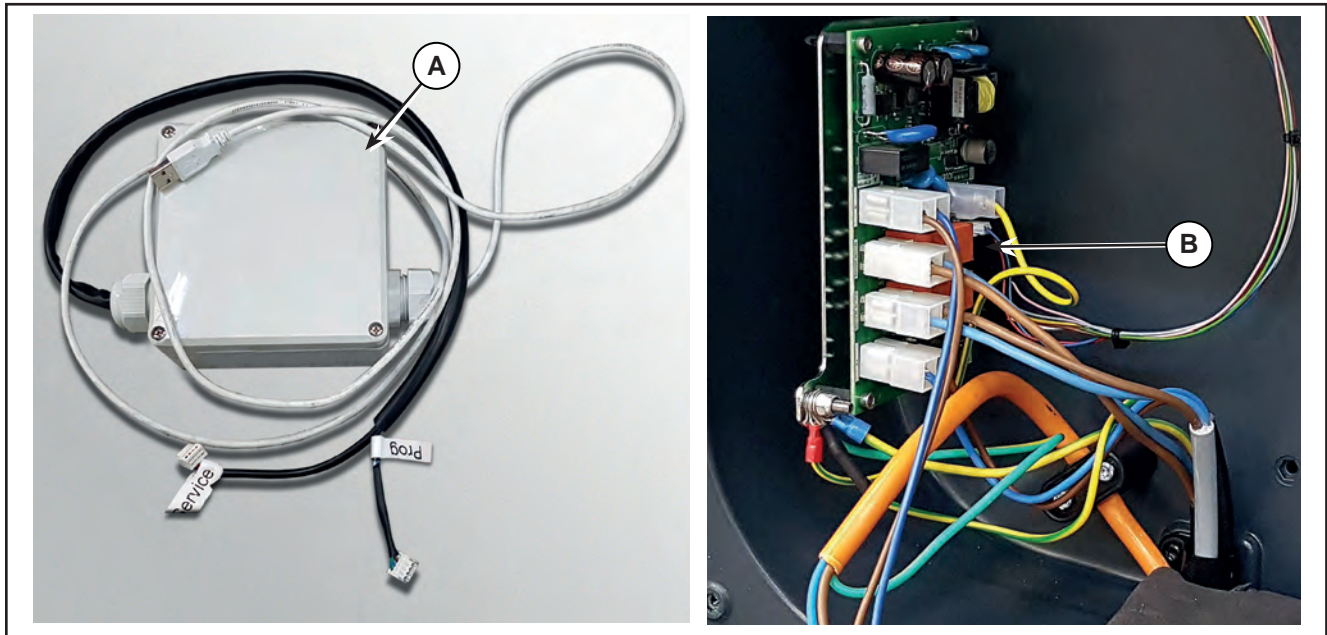


Figure 3:

3. Connect the cable marked PROG (C) to connector (D) and the cable marked SERVICE (E) to connector (F) on the Main Machine Controller (EB1).

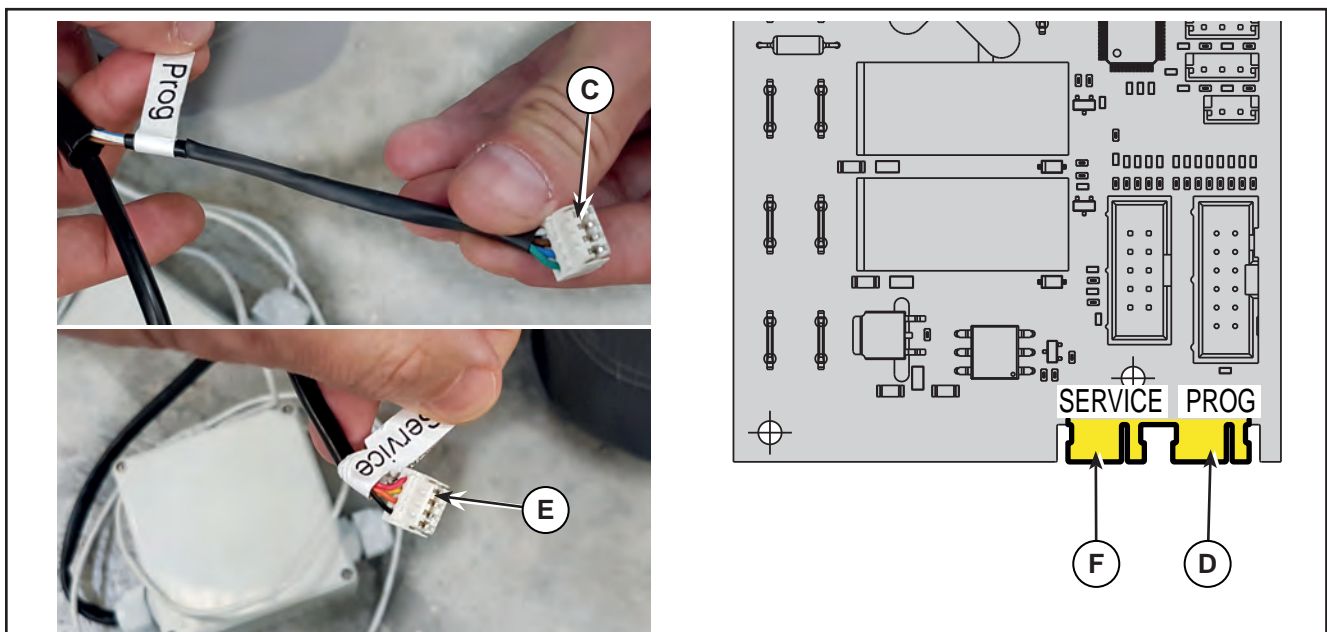


Figure 4:



## Parameter Machine Settings (continues)

- Connect the USB cable (G) of the NEO Service Tool module to a laptop computer (H) and start the NilfiskServiceTool software.
- Enter the Service/Tech access level password to the menu "SETTINGS" (I):

Access level	Password
Developer	N/D
<b>Service/Tech</b>	<b>tech</b>
Production	prod
NPI "New Product Introduction" (Engineers)	npi
Sales	sale
Customer	cust

- Access the parameters to "configure" (J).

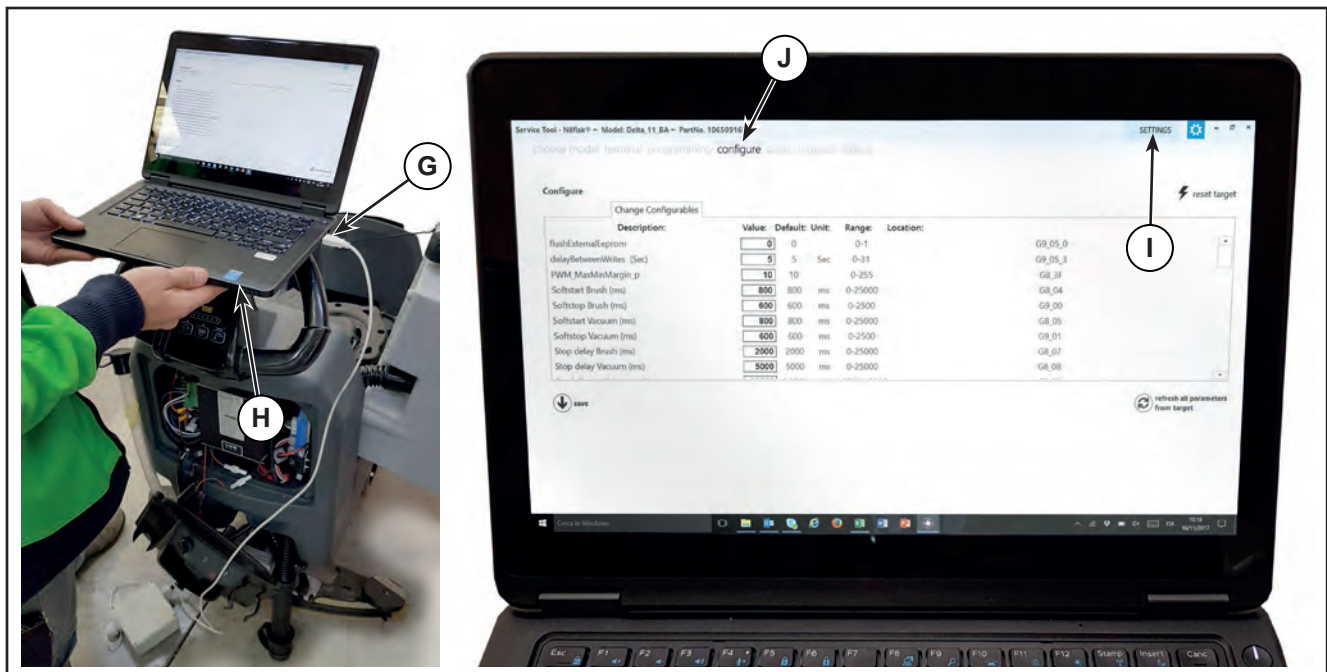


Figure 5:

Parameter Description		Range	Resolution	Default	Permissions: - = not visible R = read only W = read & write					
					Developer	Service/Tech	Production	NPI	Sales	Customer
	Stopdelay Brush (ms)	0-25000	1	3000	W	W	R	R	-	-
	Stopdelay Vacuum (ms)	0-25000	1	5000	W	W	R	R	-	-
T1on	Pump state1 on time (ms)	5-255	1	7	W	W	R	R	-	-
T1off	Pump state1 off time (ms)	0-255	1	33	W	W	R	R	-	-
T2on	Pump state2 on time (ms)	5-255	1	17	W	W	R	R	-	-
T2off	Pump state2 off time (ms)	0-255	1	23	W	W	R	R	-	-
T3on	Pump state3 on time (ms)	5-255	1	40	W	W	R	R	-	-
T3off	Pump state3 off time (ms)	0-255	1	0	W	W	R	R	-	-
Tm	Pump time multiplier	1-255	1	100	W	W	R	R	-	-

## Removal and Installation

### Main Machine Controller (EB1)



**WARNING:** Electrostatic sensitive device, observe precautions for handling. Use the specific ESD gloves. The operator should not wear a sweater, fleece or other wool or synthetic clothing when changing the PCB. The wrist strap must be connected to an earth ground. See the relevant instructions.



Figure 6:

1. Make sure that the scrubber is disconnected from the power supply.
2. Unscrew the 4 screws (A) and remove the electronic component compartment cover (B) to access on the Main machine controller (C).

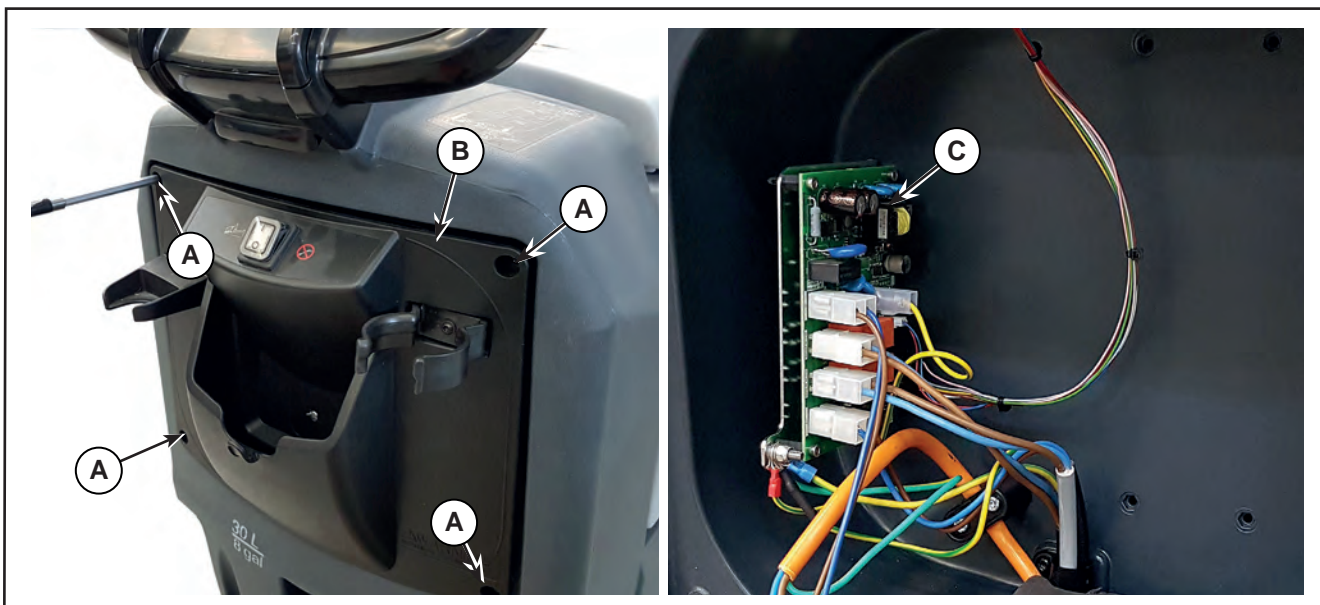


Figure 7:

### Main Machine Controller (EB1) (continues)

3. Identify connections beforehand by marking the cables with some tape and a marker, as shown below:
- (D) Start switch connection (SW1).
  - (E) Brush motor connection (M1).
  - (E) Vacuum motor connection (M2).
  - (G) Solenoid valve connection (EV1).

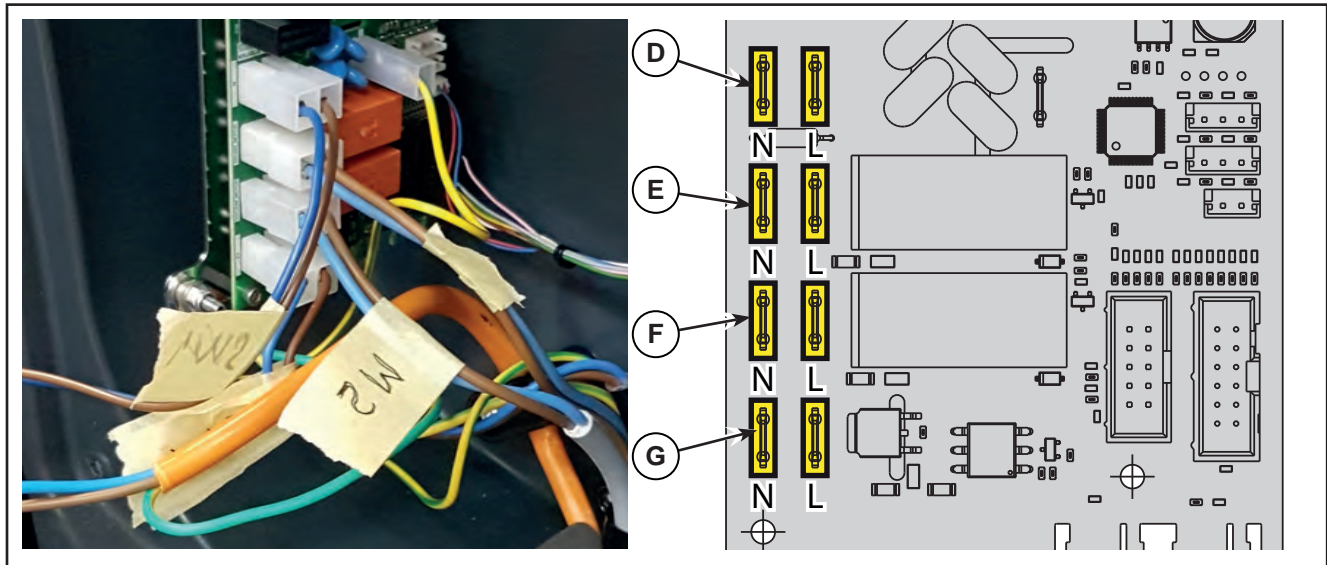


Figure 8:

4. Disconnect the following connections:
- (D) Start switch (SW1) connection .

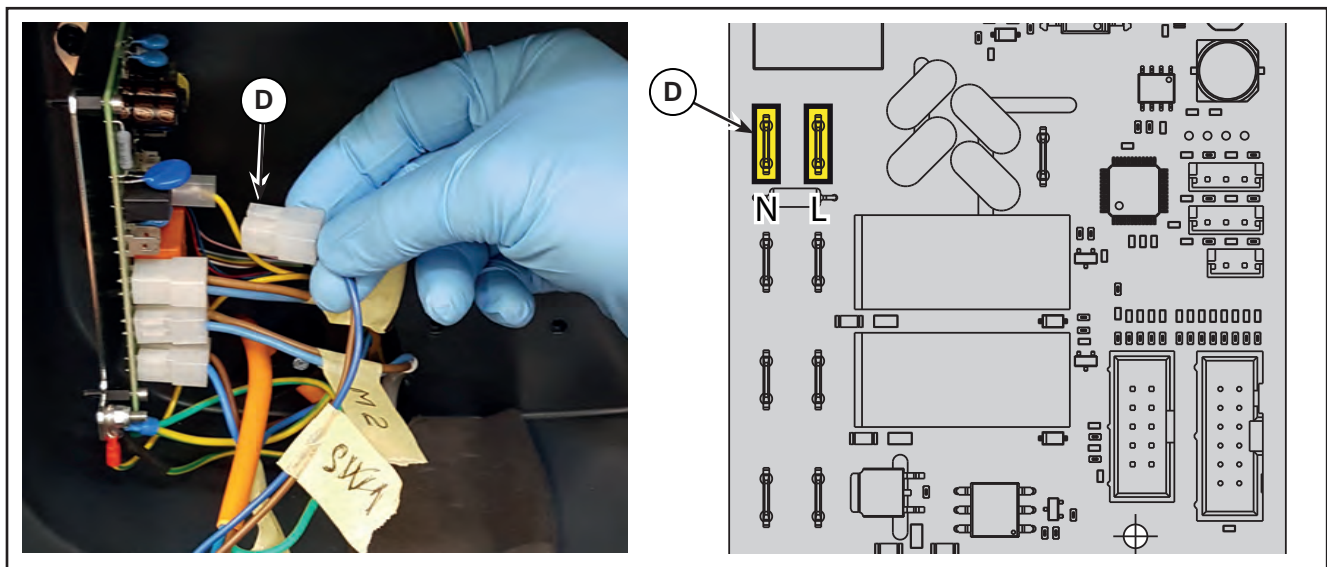


Figure 9:



## Main Machine Controller (EB1) (continues)

- (E) Brush motor (M1) connection.

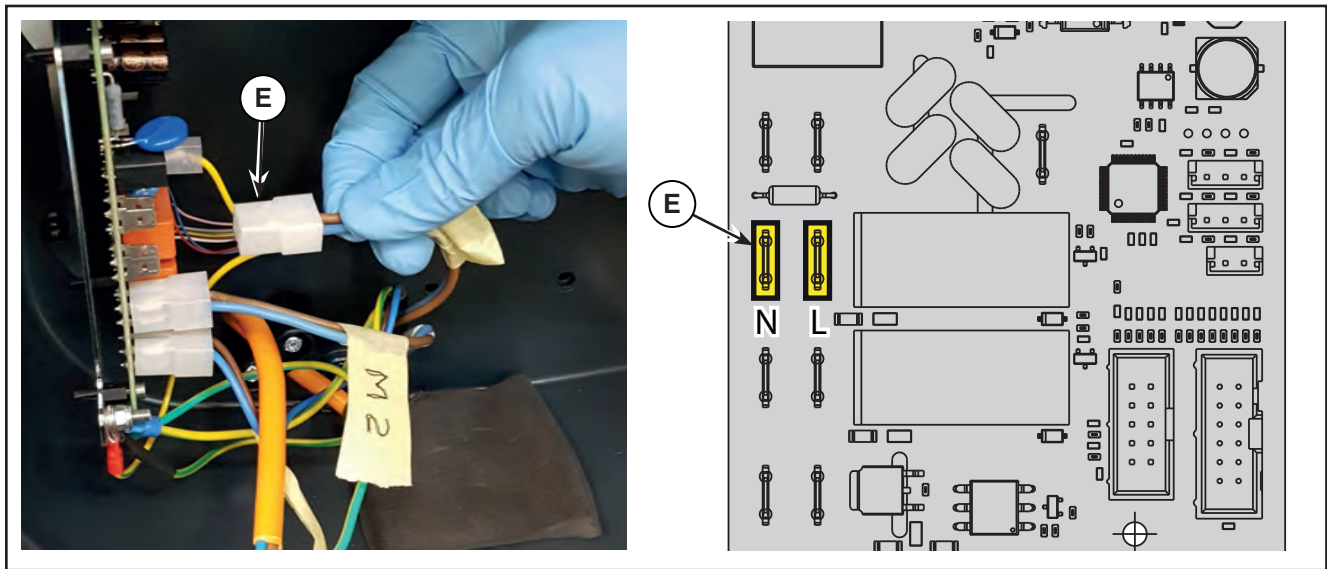


Figure 10:

- (F) Vacuum motor (M2) connection.

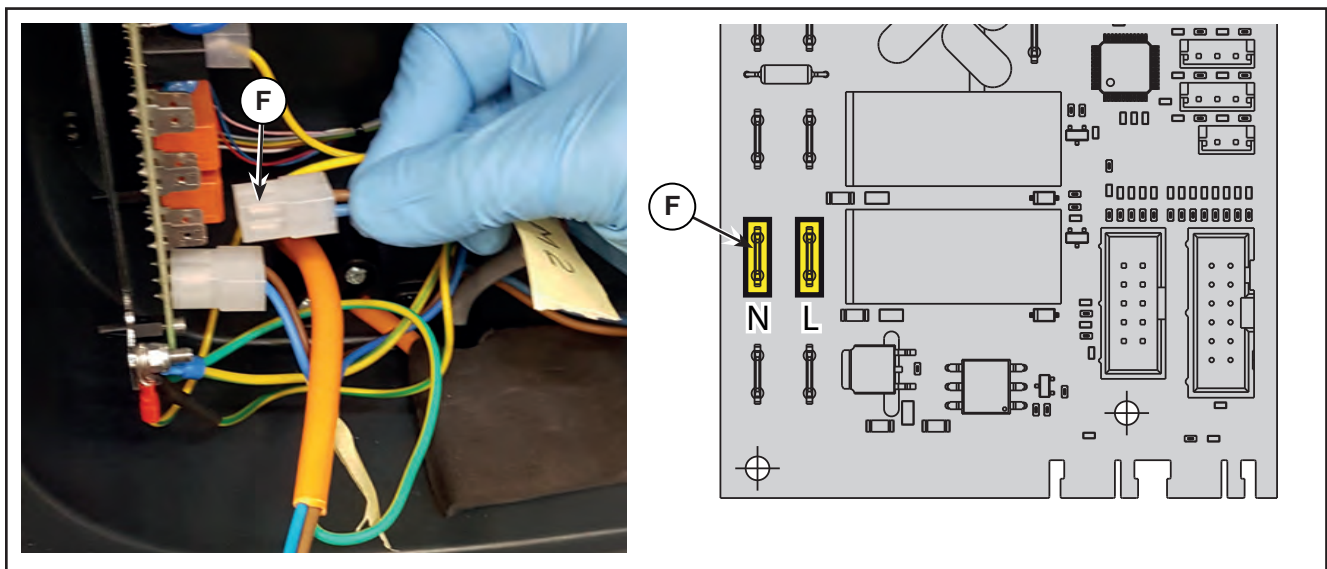


Figure 11:



### Main Machine Controller (EB1) (continues)

- (G) Solenoid valve (EV1) connection.

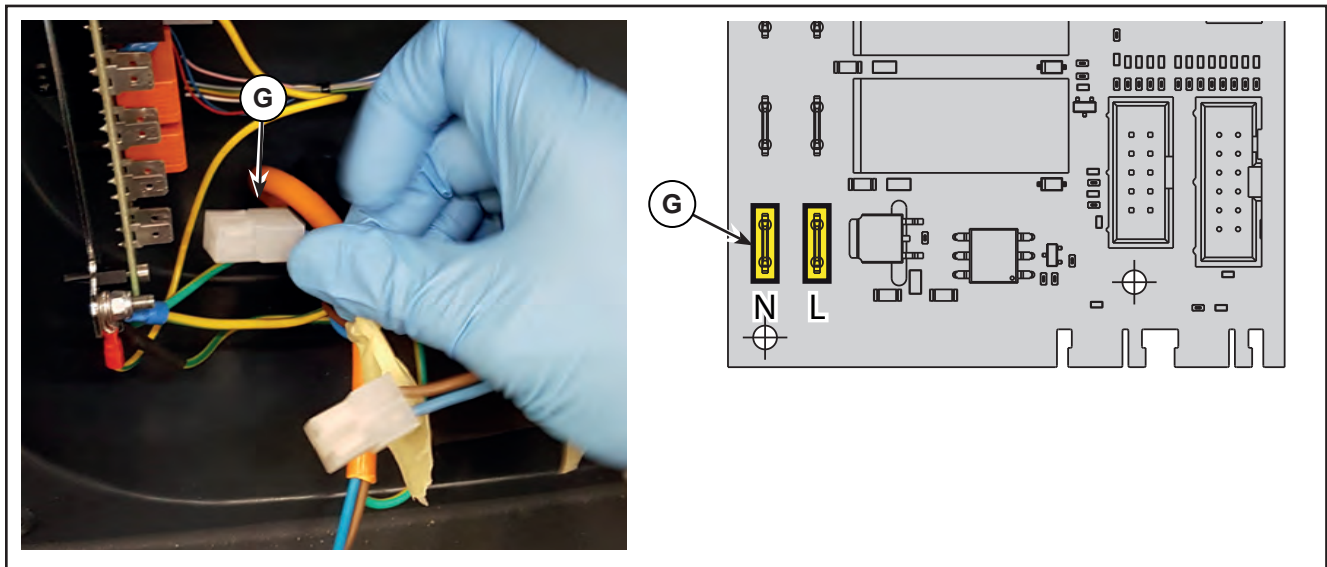


Figure 12:

- (H) Earth connection.

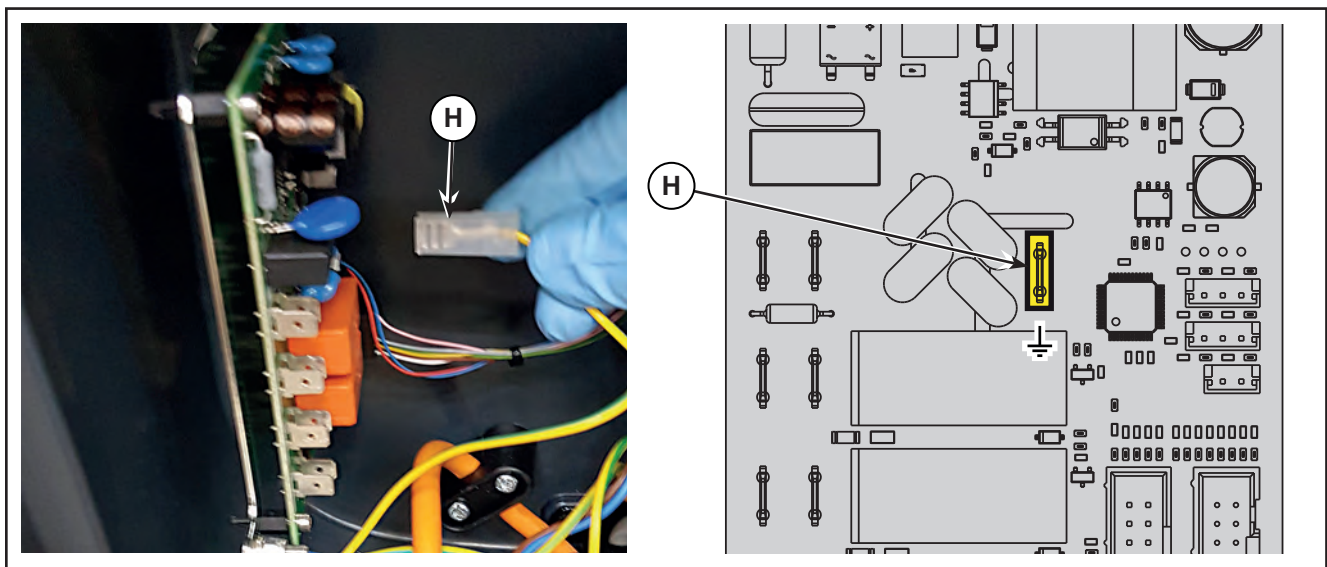


Figure 13:

### Main Machine Controller (EB1) (continues)

- (I) User interface controller (EB2) power button connection.

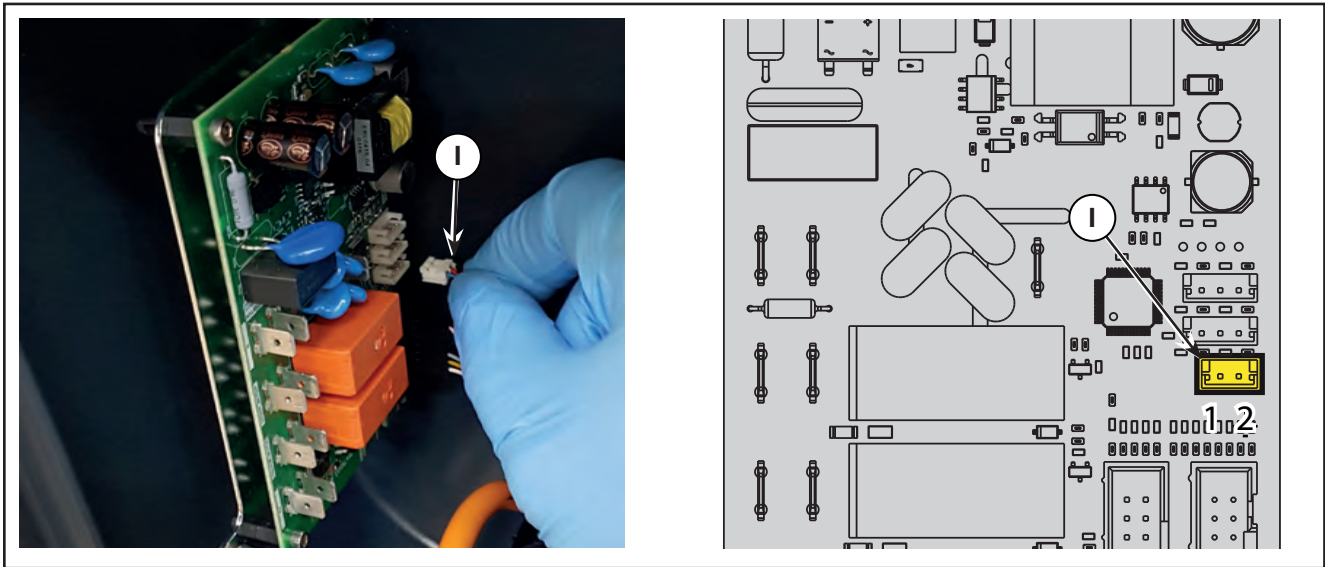


Figure 14:

- (K) User interface controller (EB2) connection.

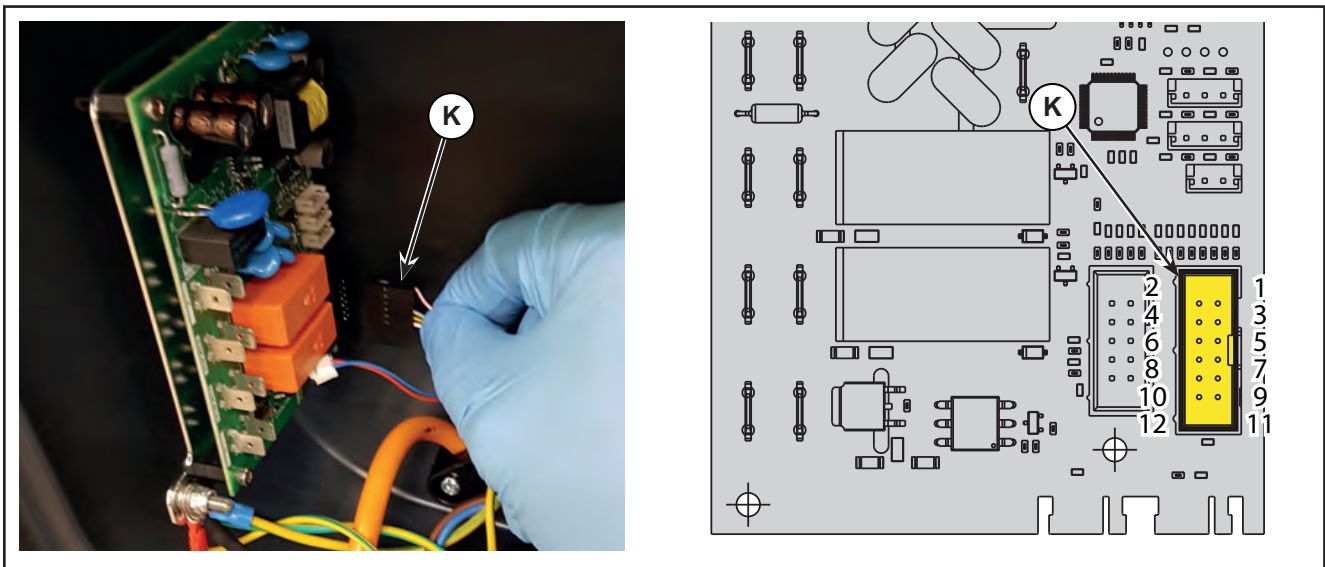


Figure 15:

**Main Machine Controller (EB1) (continues)**

5. Unscrew the 4 screws (J) and carefully remove the Main machine controller (L).

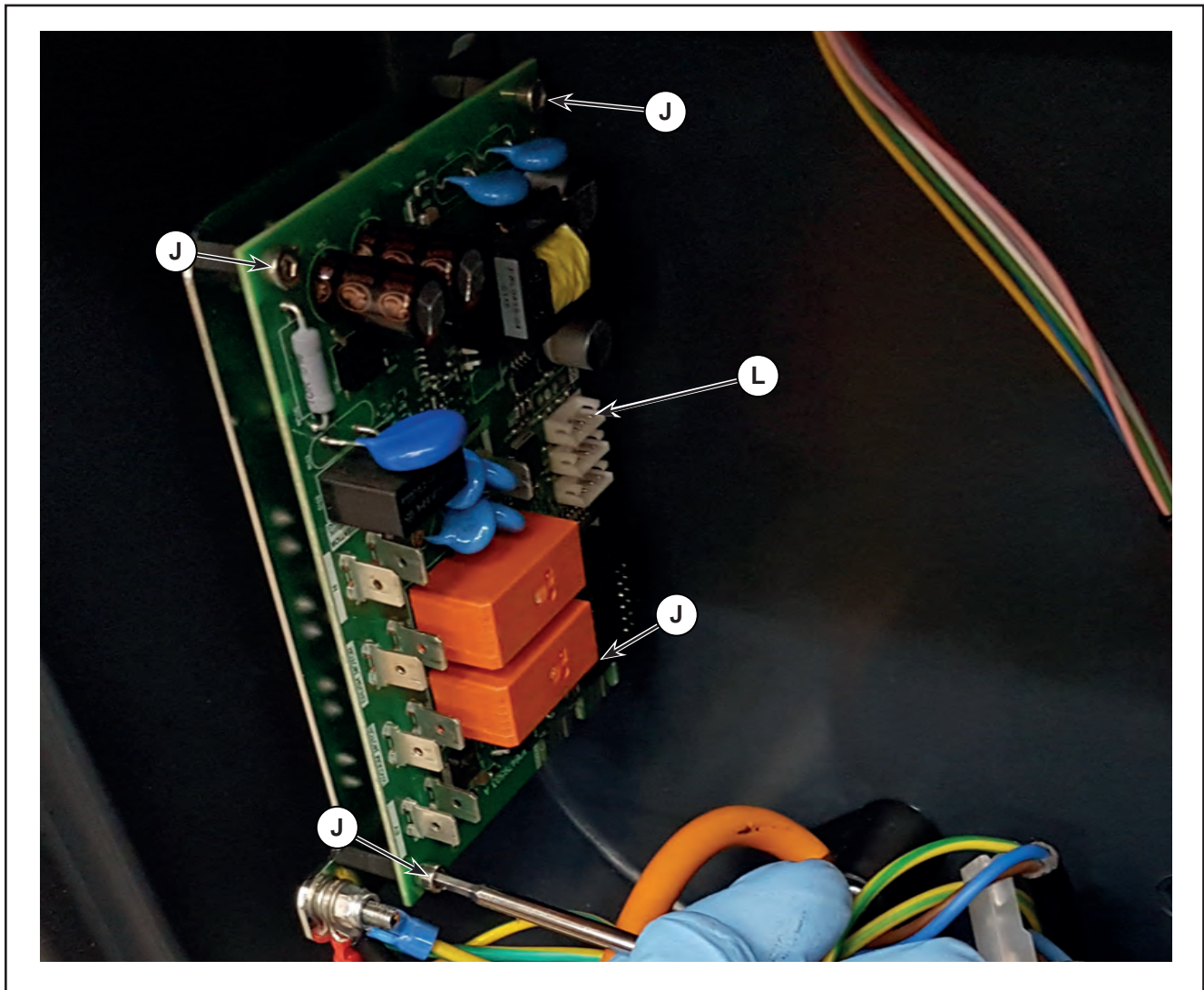


Figure 16:

6. Assemble the components in the reverse order of disassembly.



## User Interface Controller (EB2) and Operator's Presence Sensors (S1, S2)

### User Interface Controller (EB2)

1. Make sure that the scrubber is disconnected from the power supply.
2. Unscrew the 2 screws (A) and open the user interface controller cover (B).
3. Disconnect the following connections:
  - (C) and (D), left and right Operator's presence sensors connection.
  - (E) User interface controller power supply connection (J201).
4. Carefully remove the User interface controller (F) detaching it from the cover (B).
5. Clean the cover area from the glue remained of the User interface controller removed.

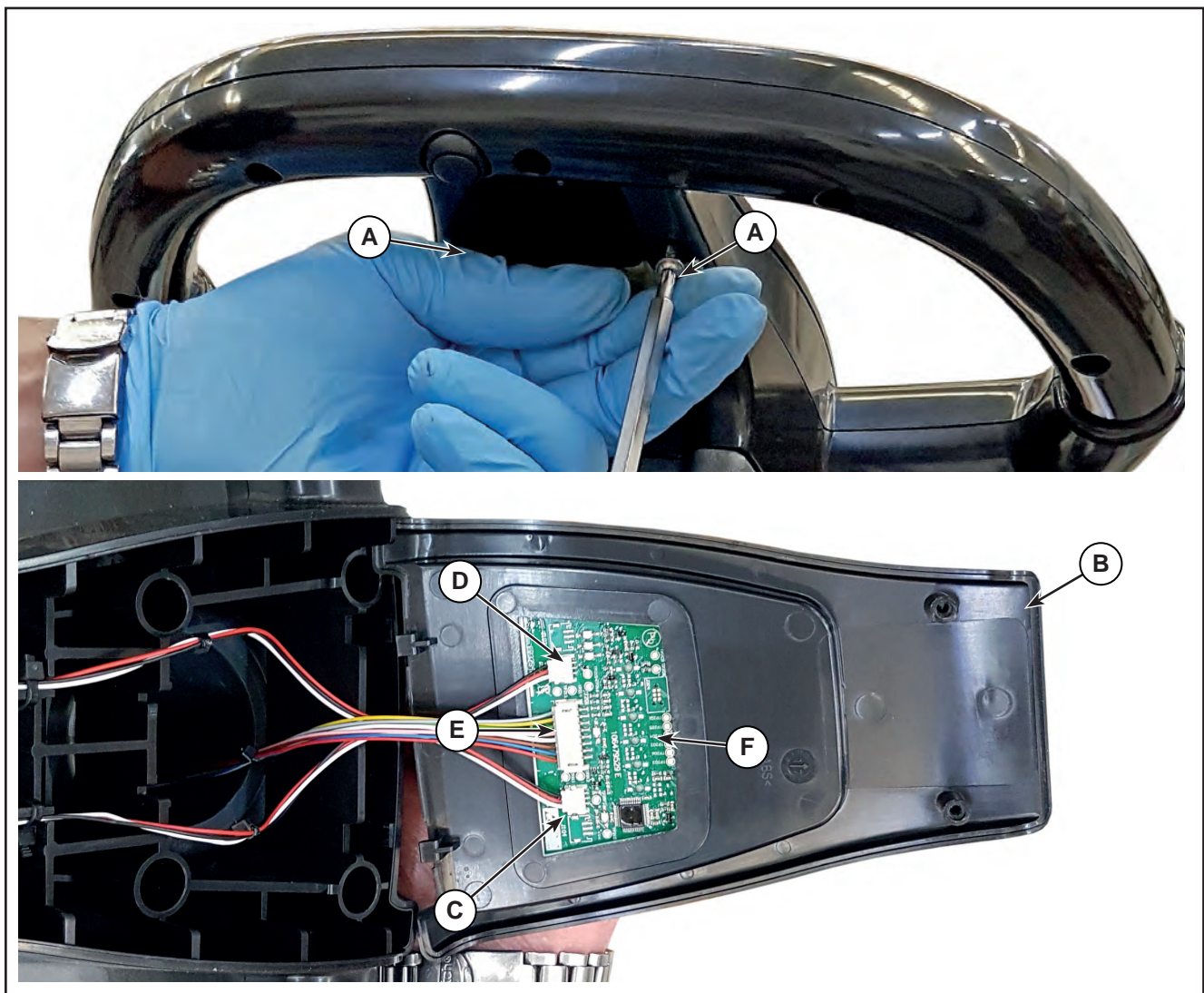


Figure 17:

6. Assemble the components in the reverse order of disassembly.



**Note:** The new User interface controller is provided with an self-adhesive seat for assembling.

### Operator's Presence Sensors (S1, S2)

1. After removing the user interface controller cover and its connections, unscrew the 4 screws (G) then remove the handlebar (H).
2. At the workbench, unscrew the 7 screws (I) to open the two handlebar parts front and back.
3. Disconnect the connection (J), with the screwdriver carefully remove the operator's presence sensor (K) detaching it from the support.
4. Clean the support area from the glue remained of the operator's presence sensor removed.

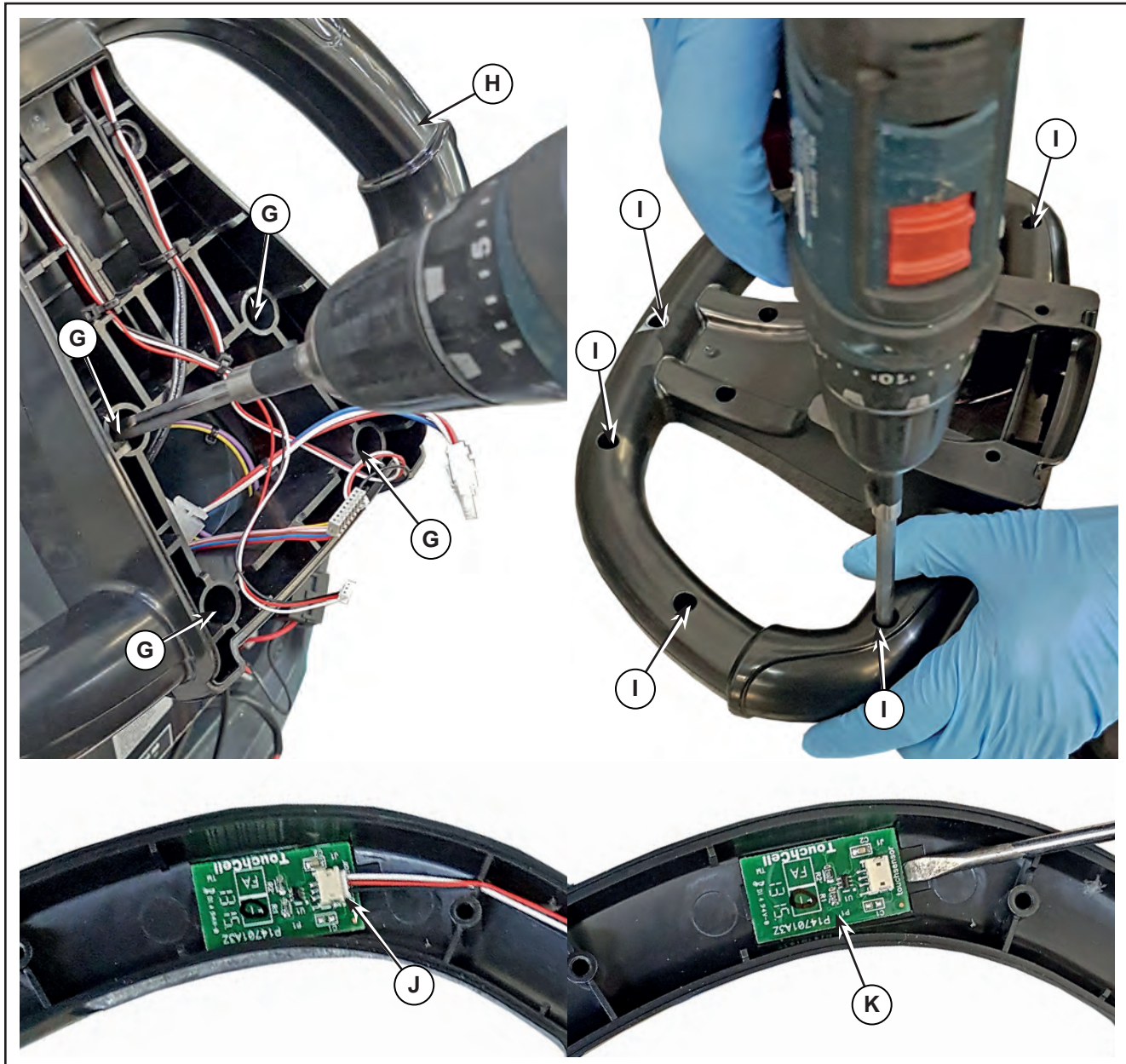


Figure 18:

5. Assemble the components in the reverse order of disassembly.



**Note:** The new operator's presence sensor is provided with an self-adhesive seat for assembling.



Specifications

Main Machine Controller (EB1) Connectors

MAINS: type 2 x faston 6,3 x 0,8 mm					
PIN	Description	Controller in/out	V ref.	I max.	Connected to
1	Mains	In	230Vac	15A	SW1
2	Mains	In	230Vac	15A	SW1

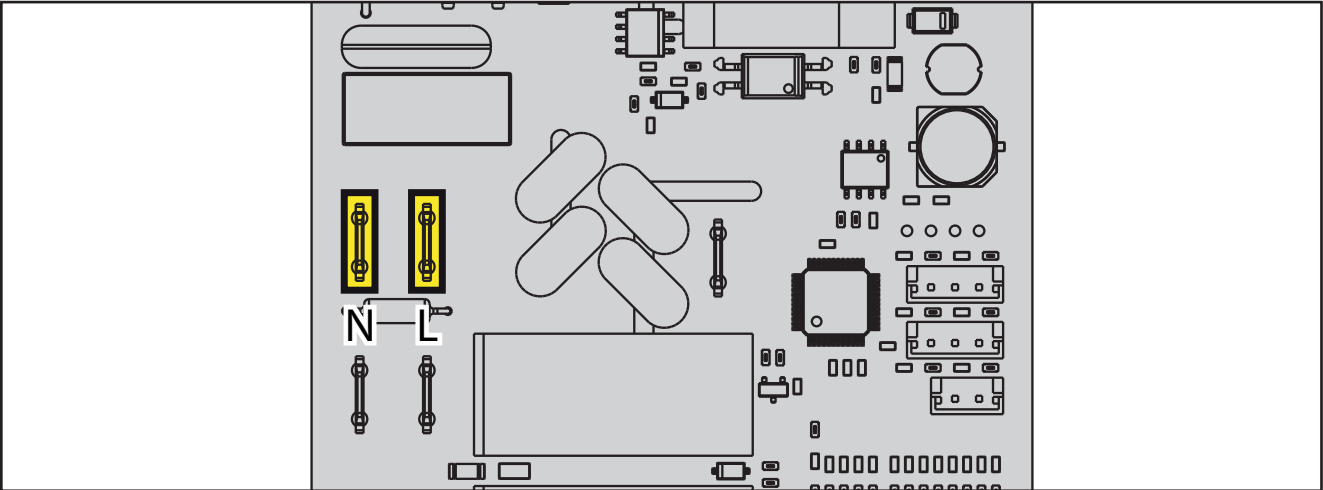


Figure 19:

GROUND: type faston 6,3 x 0,8 mm					
PIN	Description	Controller in/out	V ref.	I max.	Connected to
1	Ground	In	0Vac	-	Earth bolt

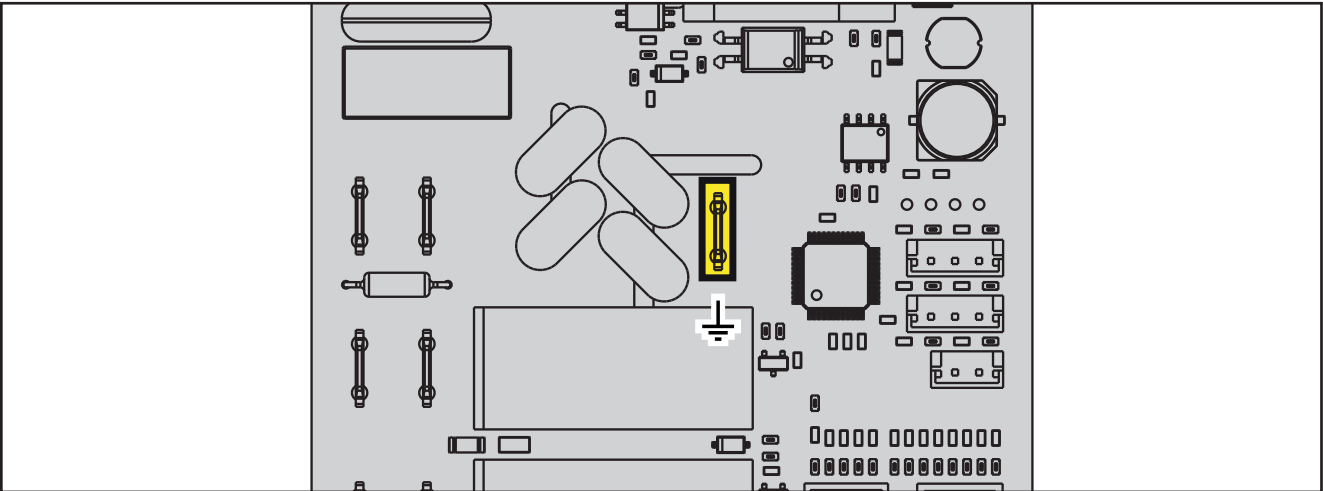


Figure 20:

Main Machine Controller (EB1) Connectors (continues)

OUT1: type 2 x faston 6,3 x 0,8 mm					
PIN	Description	Controller in/out	V ref.	I max.	Connected to
1	Brush output	Out	230Vac	15A	M1+
2	Brush output	Out	230Vac	15A	M1-

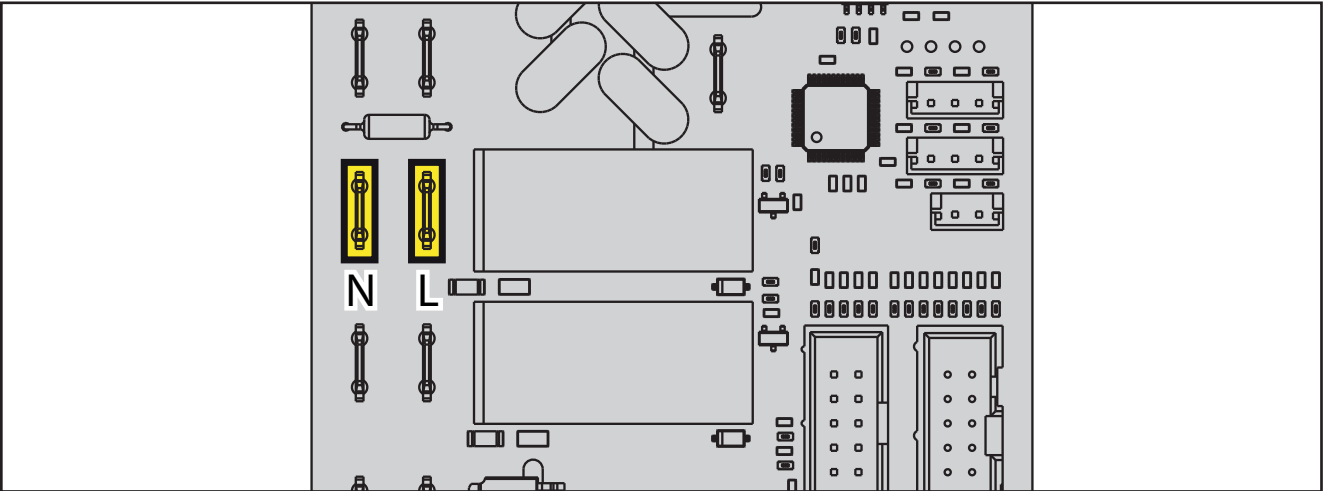


Figure 21:

OUT2: type 2 x faston 6,3 x 0,8 mm					
PIN	Description	Controller in/out	V ref.	I max.	Connected to
1	Vacuum output	Out	230Vac	5A	M2+
2	Vacuum output	Out	230Vac	5A	M2-

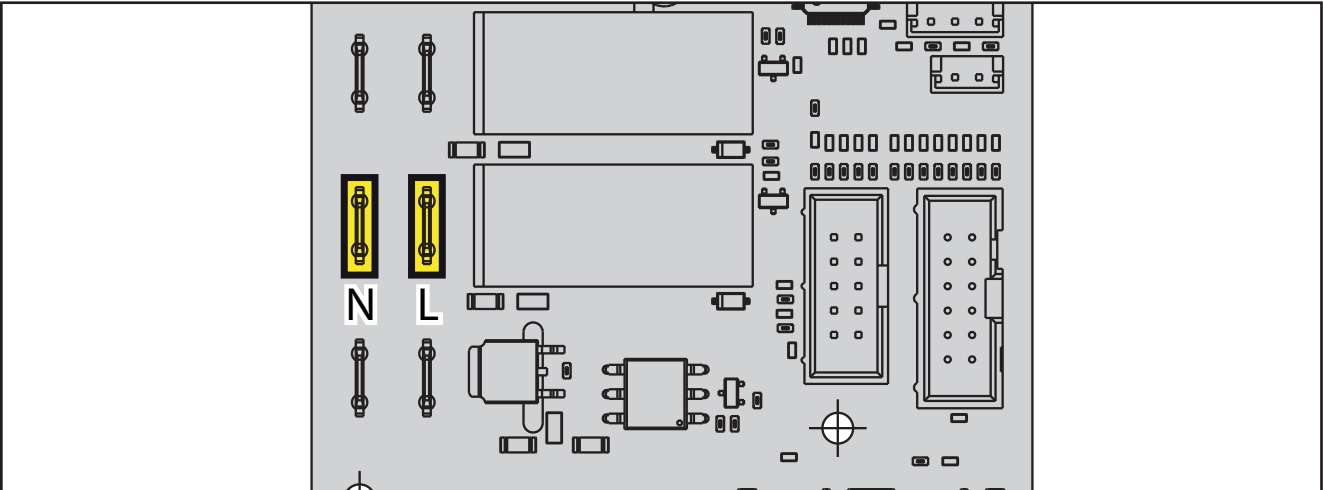


Figure 22:

Main Machine Controller (EB1) Connectors (continues)

OUT3: type 2 x faston 6,3 x 0,8 mm					
PIN	Description	Controller in/out	V ref.	I max.	Connected to
1	Solution valve output	Out	230Vac	1A	EV+
2	Solution valve output	Out	230Vac	1A	EV-

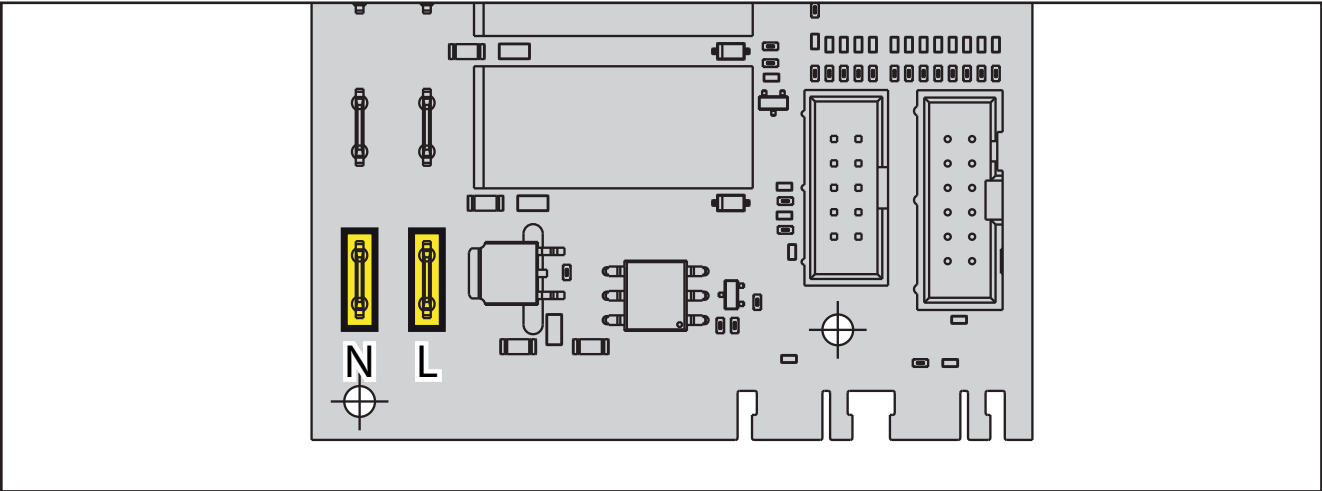
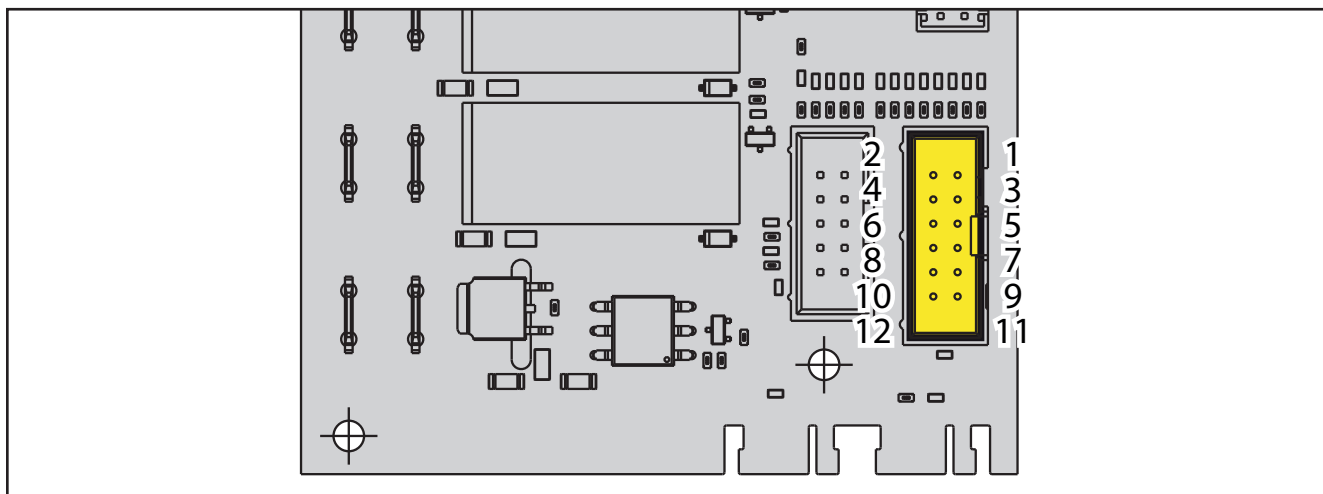


Figure 23:

**Main Machine Controller (EB1) Connectors (continues)**

EXT: LEOCO 3675P12VTA0 ( ) (12 ways, vertical)					
PIN	Description	Controller in/out	V ref.	I max.	Connected to
1	Power supply +	Out	5V	<1A	UI.J201.6
2	Power supply -	Out	0V	<1A	UI.J201.5
3	SPI MISO	In-out	0-5V	<1A	UI.J201.3
4	SPI MOSI	In-out	0-5V	<1A	UI.J201.2
-	-	-	-	-	-
6	SPI clock	Out	0-5V	<1A	UI.J201.1
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
11	SPI CS3	Out	0-5V	<1A	UI.J201.4
-	-	-	-	-	-

**Figure 24:**

Main Machine Controller (EB1) Connectors (continues)

J211 A: JST B2B-EH-A (LF)(SN) (2 ways, vertical)					
PIN	Description	Controller in/out	V ref.	I max.	Connected to
1	Power button output	Out	5V	<1A	UI.J201.8
2	Power button input	In	5V	<1A	UI.J201.7

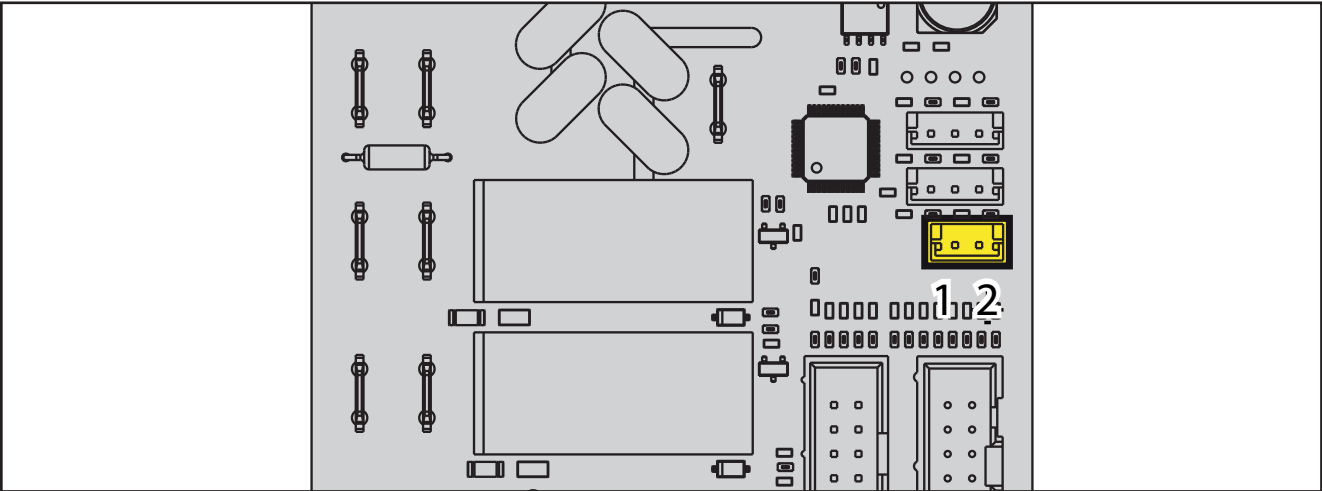


Figure 25:



## User Interface Controller (EB2) Connectors

J201: SJT S8B-PH-SM4-TB (8 ways, vertical)					
PIN	Description	Controller in/out	V ref.	I max.	Connected to
1	SPI clock	In	0-5V	<1A	EXT.6
2	SPI MOSI	In-out	0-5V	<1A	EXT.4
3	SPI MISO	In-out	0-5V	<1A	EXT.3
4	SPI CS3	In	0-5V	<1A	EXT.11
5	Power supply -	In	0V	<1A	EXT.2
6	Power supply +	In	5V	<1A	EXT.1
7	Power button output	Out	5V	<1A	BUTTON.2
8	Power button input	In	5V	<1A	BUTTON.1

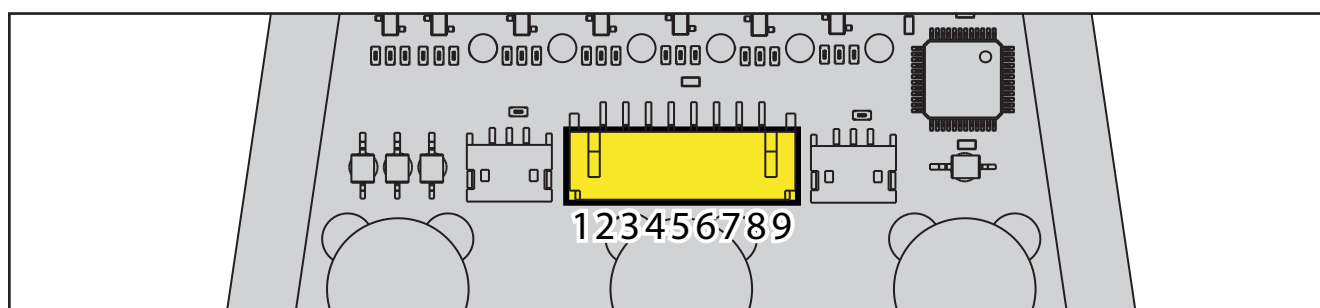


Figure 26:

LEFT: JST S3B-ZR-SM4A-TF (3 ways, side entry)					
PIN	Description	Controller in/out	V ref.	I max.	Connected to
1	Left operator presence sensor supply -	out	0V	<1A	S1.1
2	Left operator presence sensor supply +	out	5V	<1A	S1.2
3	Left operator presence sensor input	In	0V	<1A	S1.3

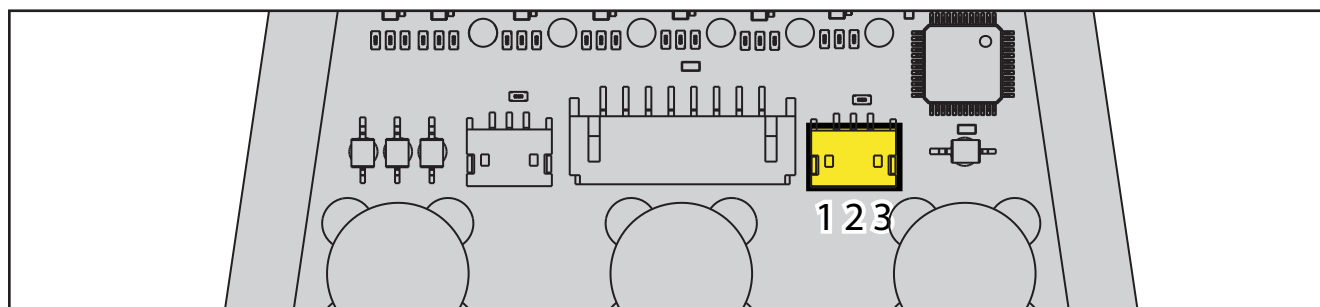


Figure 27:

User Interface Controller (EB2) Connectors (continues)

RIGHT: JST S3B-ZR-SM4A-TF (3 ways, side entry)					
PIN	Description	Controller in/out	V ref.	I max.	Connected to
1	Right operator presence sensor supply -	out	0V	<1A	S2.1
2	Right operator presence sensor supply +	out	5V	<1A	S2.2
3	Right operator presence sensor input	In	0V	<1A	S2.3

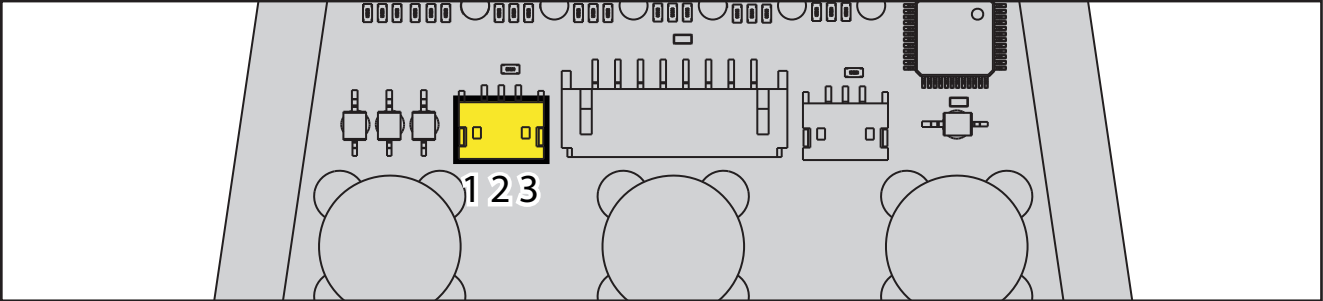


Figure 28:

## 10 - Chassis System

### Chassis (Main Parts)

The chassis function is primarily performed by the solution tank, the support housings for the wheels and working mechanisms are integrated in the gear motor unit (Drive model) and the rear frame.

Reference to the Figure:

- Deck raising levers
- Frame integrated in the drive motor
- Front wheels
- Rear pivoting wheels support frame with squeegee raising/lowering system

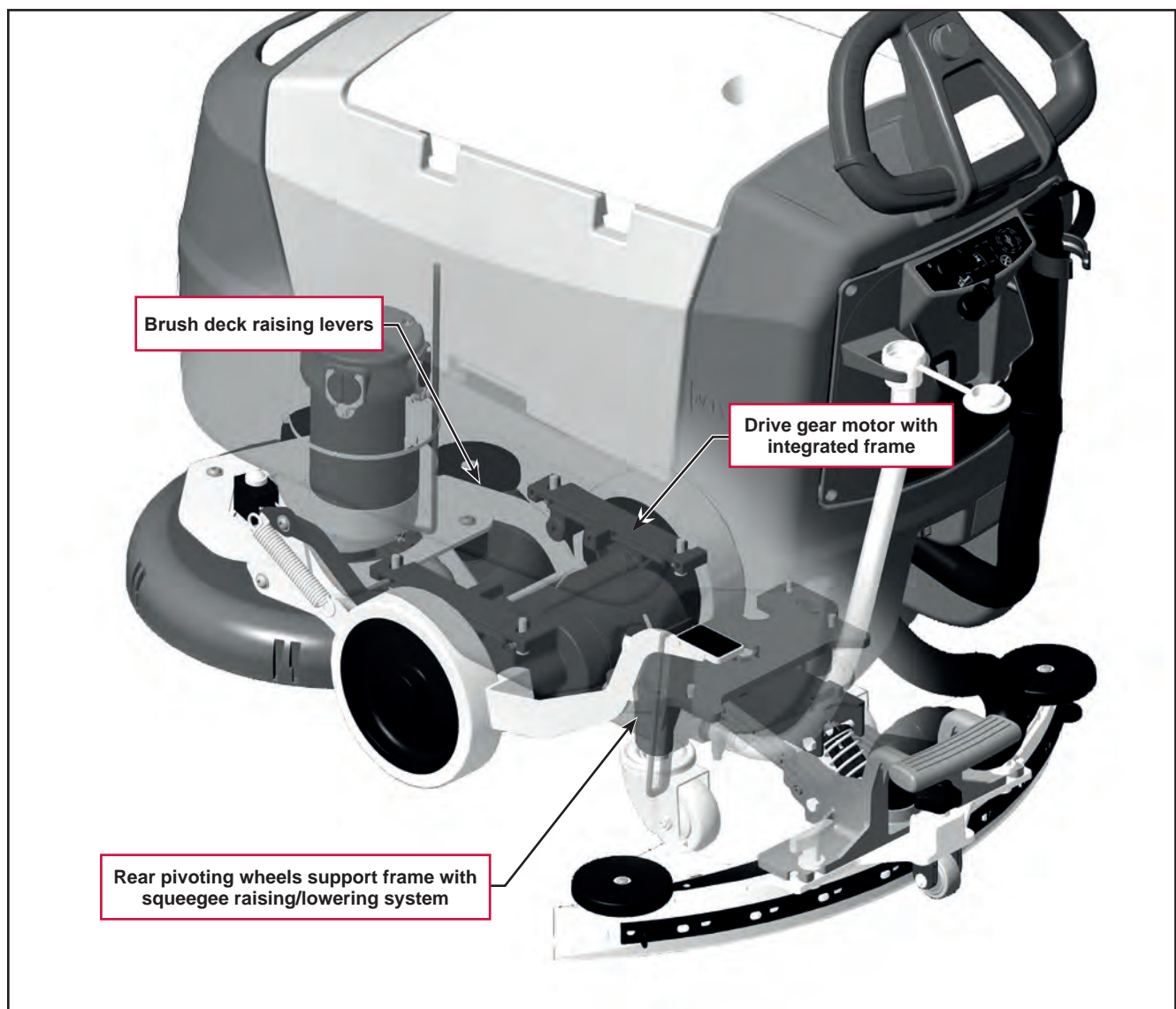


Figure 1:

## 14 - Wheel System, Non-Traction

### Functional Description

The machine wheel system without drive system consists of front wheels and a pair of pivoting rear wheels.

The front wheel system is the main machine support and pivot of the lifting and lowering brush deck mechanism.

### Component Locations

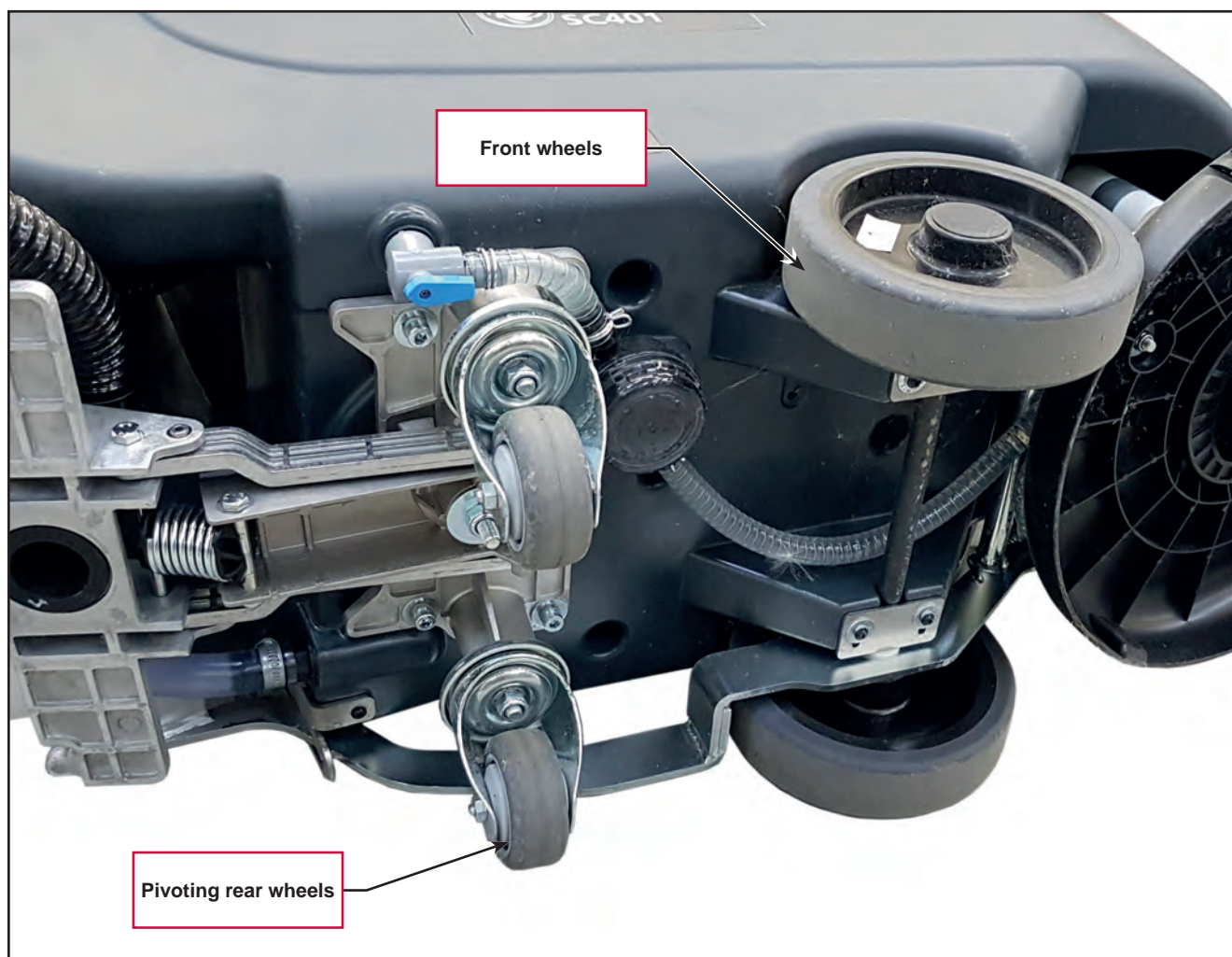


Figure 1:

## Specifications

Description / Model	SC401, SCRUBTEC 344
	No Drive
Front wheel diameter	7.8 in (200 mm)
Front wheel specific pressure on the floor (*)	116 psi (0,8 N/mm <sup>2</sup> )
Rear wheel diameter	3,1 in (80 mm)
Rear wheel specific pressure on the floor (*)	116 psi (0,8 N/mm <sup>2</sup> )
Maximum gradient when working	2%

(\*) Machines have been tested under the following conditions:

- Battery maximum size (Battery)
- Maximum brush and squeegee size
- Full detergent tank
- Optional equipment installed
- Wheel weight checked
- Print on the floor checked on cement for each single wheel
- Result expressed as maximum value for both front and rear wheels



## 20 - Wheel System, Traction

---

### Functional Description

The machine wheel system with drive system consists of front wheels with gearmotor (M3) and a pair of pivoting rear wheels.

The Gear motor unit (M3) with electric motor, reduction unit, differential and drive wheels is the main machine support and fastening element of the brush deck lifting and lowering mechanism.

Using the Operator presence sensor (S1, S2), the operator can start the machine. The Speed adjuster (RV1) adjusts the transfer speed. To reverse the machine, press the Reverse Gear Switch (SW1).

When turning on the machine using the Ignition key (K1), the Drive wheels controller (EB3) checks that the Operator presence sensors (S1, S2) are not active (through a signal emitted by the Main machine controller (EB1); otherwise, it triggers an alarm (3 LED blinks) that is displayed on the Drive wheels controller, and inhibits the drive system (see [“Drive wheels controller \(EB3\) alarms”](#) paragraph).



**Note:** *In most of the real usage cases, if there is not any failure, this safety feature is not visible to the user because of the Drive wheels controller (EB3) is turned on as soon as the user turns on the Ignition Key (K1), but the Operator presence sensor signals are given to the Drive wheels controller (EB3) only after the Main machine controller (EB1) is turned on pushing the Main button. So, if the user turn on the machine pushing the Main button with one hand on the Operator presence sensor (with the Ignition Key (K1) already closed), the machine will start moving without any inhibit. The alarm triggers only in case of real system failure or immediately after turning the Ignition key (K1).*

To reset and stop the Drive wheels controller (EB3) alarm, turn off and on again the machine without placing your hands on the Operator presence sensors (S1, S2).

When the Operator presence sensors (S1, S2) are activated, the Main machine controller (EB1) turns on a “drive enable” signal to the Drive wheels controller (EB3).

The Drive wheels controller (EB3) supplies power to the Gear motor unit (M3), with a voltage proportional to the Speed adjuster (RV1) position. The acceleration ramps and top speed can be set with the relevant parameters (see [“Drive wheels controller \(EB3\) parameters”](#) paragraph).

## Wiring Diagram

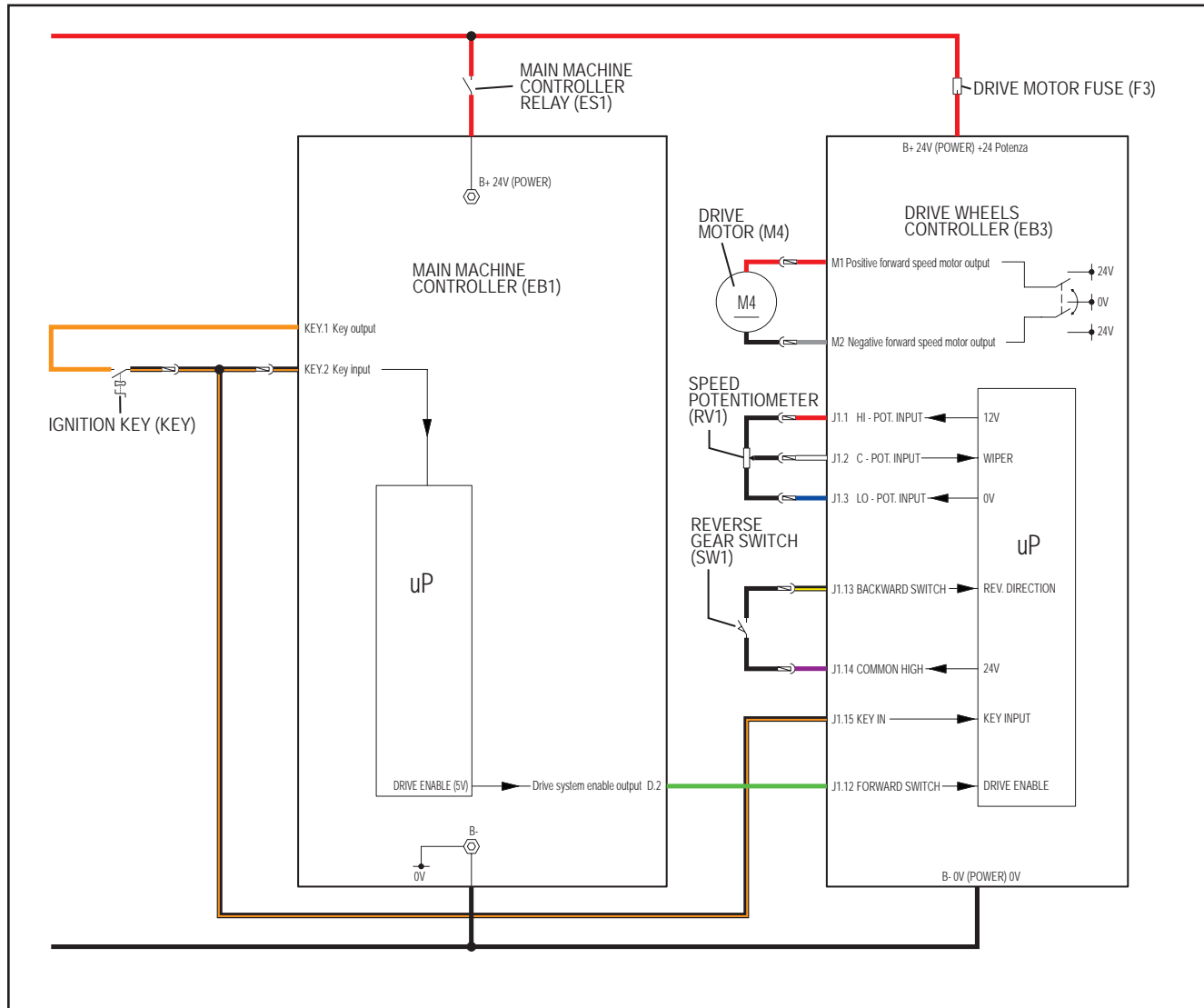


Figure 1:

## Component Locations

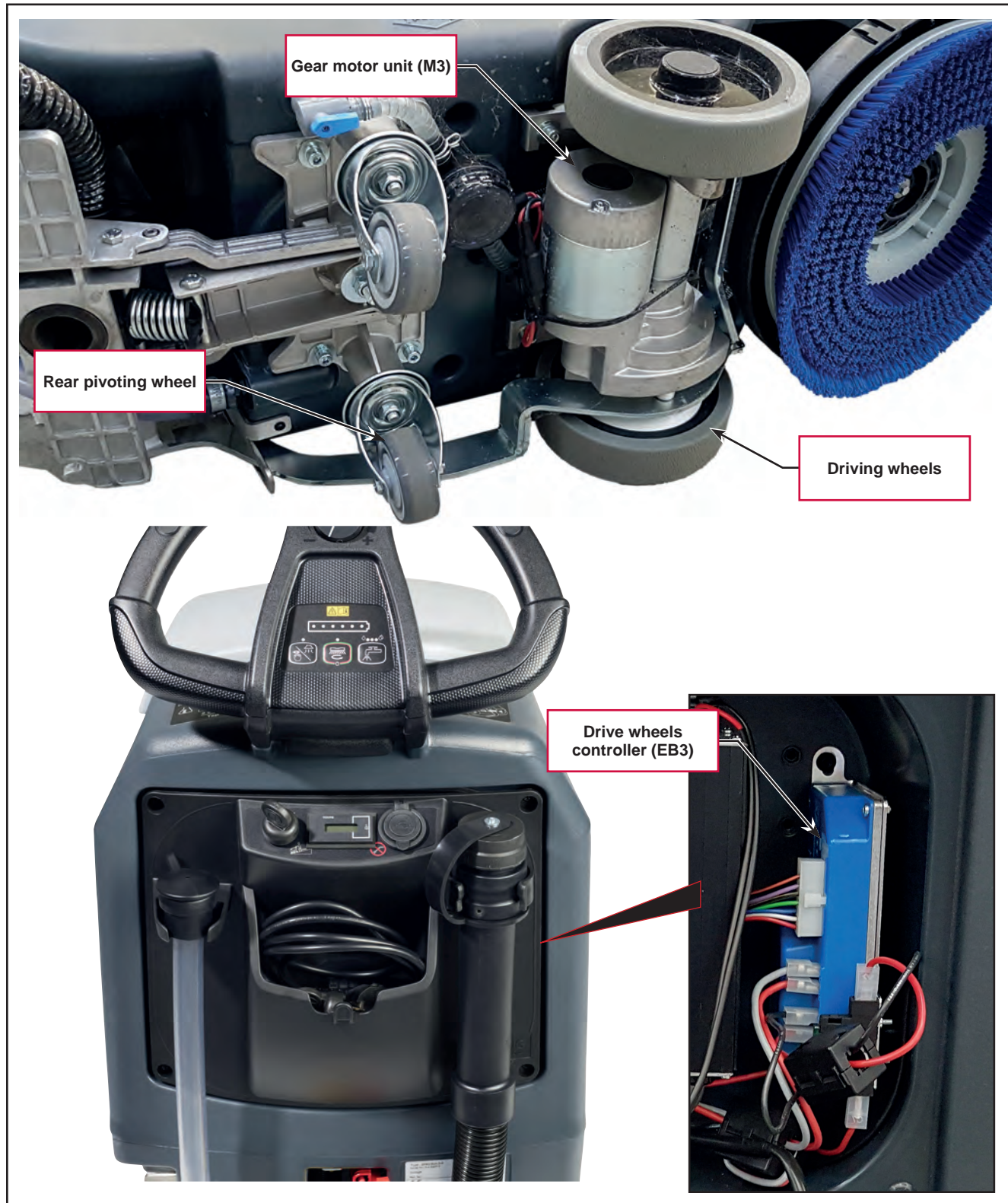


Figure 2:



## Maintenance and Adjustments

### Drive Motor Cleanig

1. Drive the machine on a level floor or on a hoisting system to facilitate the procedures.
2. If equipped remove the ignition key, then disconnect the red battery connector.
3. Under the machine, check and clean the drive motor (A) by using compressed air nozzle (B) from the dirt/dust that could compromise its correct function (overheating, overvoltage ect.).

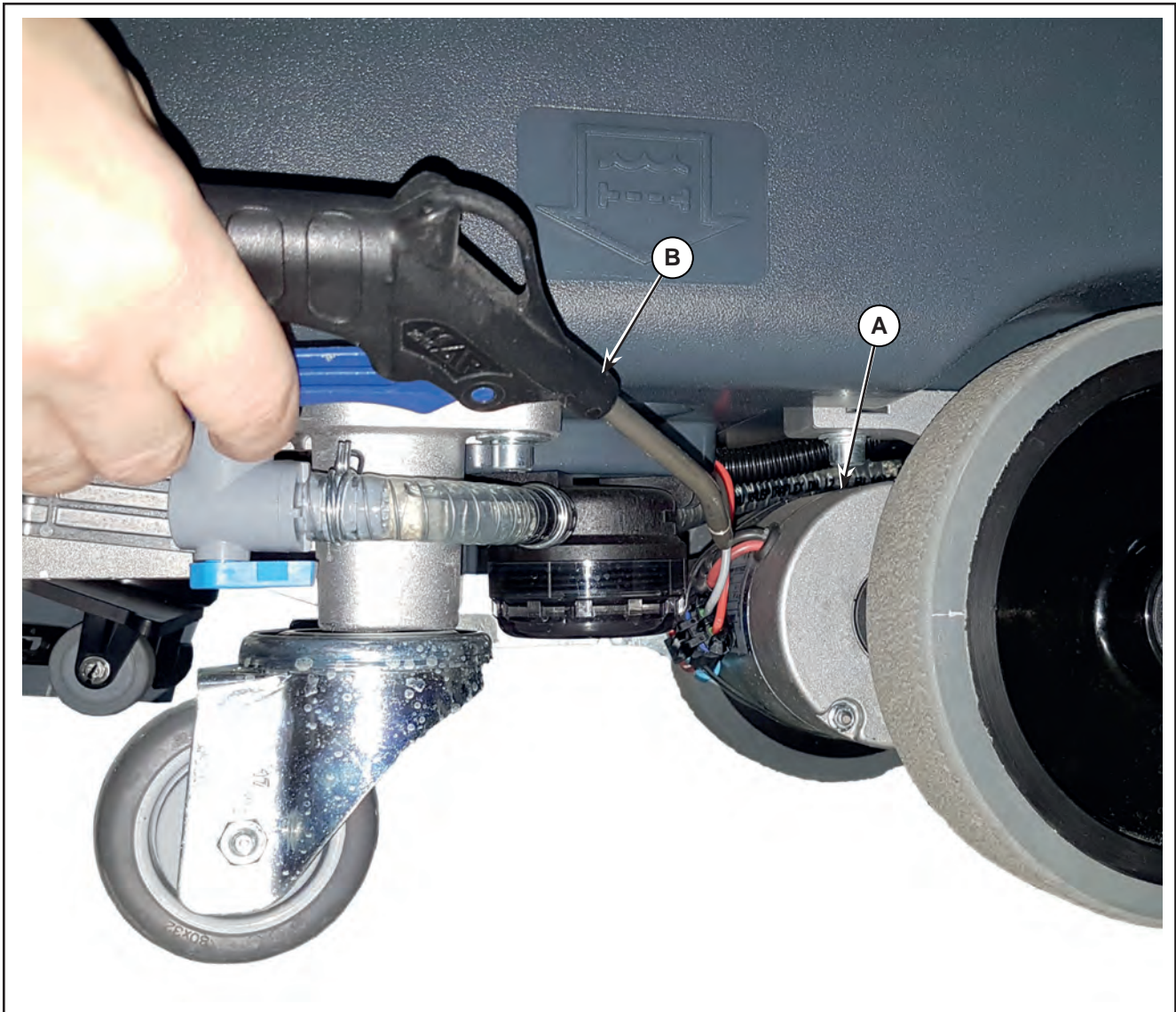


Figure 3:

### Drive Wheels Controller (EB3) Parameters

The parameters are accessible when connect the connector (A) of the ITALSEA programmer P/N 1466207000, to the 4-way connector (B) on the Drive wheels controller.

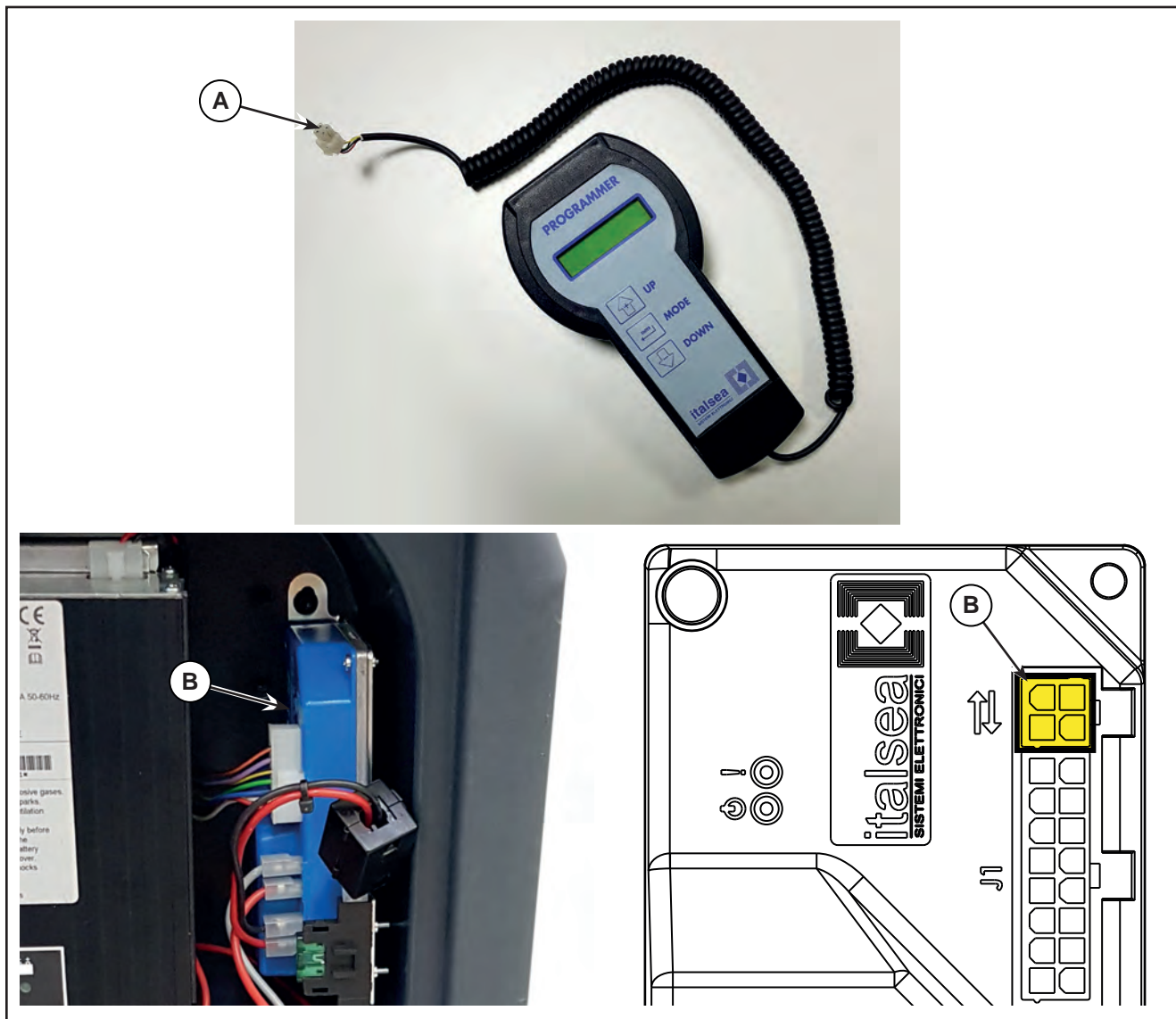


Figure 4:



**Drive Wheels Ccontroller (EB3) Parameters (continues)**

NAME	Description	Default value
<b>ACCELERATION RAMP</b>	Acceleration ramp	<b>2.0</b>
<b>REVERSE RAMP</b>	Reverse deceleration ramp	<b>0.5</b>
<b>NEUTRAL RAMP</b>	Neutral deceleration ramp	<b>0.8</b>
<b>FORWARD SPEED</b>	Forward maximum speed	<b>100</b>
<b>BACKWARD SPEED</b>	Backward maximum speed	<b>60</b>
<b>MINIMUM SPEED</b>	Minimum speed	<b>0</b>
<b>BATTERY VOLTAGE</b>	Battery Voltage	<b>24</b>
<b>SPEED REFERENCE</b>	Speed Reference	<b>Single-ended</b>
<b>REF. DEADBAND</b>	Reference Dead-band	<b>200</b>
<b>BRAKE DELAY</b>	Brake delay	<b>2.0</b>
<b>MULTIM. SPEED</b>	Speed in Mode1	<b>50</b>
<b>MULTIM. CURRENT</b>	Current in Mode1	<b>45</b>
<b>BW SAFETY TIME</b>	Backward safety time	<b>0.0</b>
<b>BW SAFETY SPEED</b>	Backward safety speed	<b>0</b>
<b>LOW BATTERY</b>	Low battery limit	<b>19</b>
<b>OPTIONAL</b>	Optional parameter	<b>0</b>
<b>RUN-AWAY</b>	Run-Away function	<b>0</b>
<b>CURRENT LIMIT</b>	Controller's current limit	<b>35</b>
<b>RATED CURRENT</b>	Motor's rated current	<b>10</b>
<b>OVERLOAD TIME</b>	Motor's overload time	<b>10</b>
<b>5-J1 HW CONFIG</b>	Pin 5 – J1 hardware config.(n.c./n.o.)	<b>N.O. switch</b>
<b>6-J1 HW CONFIG</b>	Pin 6 – J1 hardware config. (n.c./n.o.)	<b>N.O. switch</b>
<b>11-J1 HW CONFIG</b>	Pin 11 – J1 hardware config. (n.c./n.o.)	<b>N.O. switch</b>
<b>2-J1 P.up-down</b>	Pin 2 – J1 hardware config. (pull-up/down)	<b>pull-down active</b>
<b>5-J1 P.up-down</b>	Pin 5 – J1 hardware config. (pull-up/down)	<b>pull-down active</b>
<b>6-J1 P.up-down</b>	Pin 6 – J1 hardware config. (pull-up/down)	<b>pull-up active</b>
<b>11-J1 P.up-down</b>	Pin 11 – J1 hardware config. (pull-up/down)	<b>pull-down active</b>
<b>12-J1 P.up-down</b>	Pin 12 – J1 hardware config. (pull-up/down)	<b>pull-down active</b>
<b>13-J1 P.up-down</b>	Pin 13 – J1 hardware config. (pull-up/down)	<b>pull-down active</b>
<b>ENABLE ALARM 1</b>	A1 alarm enabling	<b>ENABLE</b>
<b>ENABLE ALARM 2</b>	A2 alarm enabling	<b>ENABLE</b>
<b>ENABLE ALARM 3</b>	ENABLE ALARM 3 A3 alarm enabling	<b>ENABLE</b>
<b>ENABLE ALARM 4</b>	A4 alarm enabling	<b>DISABLE</b>
<b>ENABLE ALARM 12</b>	A12 alarm enabling	<b>ENABLE</b>

## Troubleshooting

Trouble	Possible Causes	Remedy
The machine does not move	Battery voltage too low	Charge the battery
	Speed adjuster (RV1) incorrectly regulated or broken	Replace
	One or both Operator's presence sensors (S1, S2) faulty	Replace
	Main machine controller (EB1) faulty	Replace
	Drive wheels controller (EB3) LEDs blinking alarms	See the next paragraph
	Drive wheels controller (EB3) faulty	Replace
	Wiring damaged	Check all connections inside the electrical component compartment, included those of the Main machine controller (EB1) and the Drive wheels controller (EB3)
	Drive system motor (M3) faulty	Replace



Display of Drive wheels controller (EB3) diagnostic LED	Meaning	Conditions	What to do	Reset
<b>8 flashes</b>	Power supply fault	Drive motor fuse open or Drive wheels controller inner safety relay faulty	Check the conditions of the Drive motor fuse (F3) and the Drive wheels controller power supply wiring; if the problem persists, replace the Drive wheels controller (EB3).	Turn off the machine using the Ignition key (KEY)
<b>9 flashes</b>	Undervoltage	Battery voltage under 19V	Check the battery voltage and the Drive wheels controller (EB3) power supply wiring	Turn off the machine using the Ignition key (KEY)
<b>10 flashes</b>	Overvoltage	Battery voltage over 35V	Check battery voltage	Turn off the machine using the Ignition key (KEY)
<b>11 flashes</b>	Drive motor overload	Drive motor current higher than 10 Amp for an excessive period of time (the maximum time depends negatively from the overload entity).	Check if there is debris or damages preventing the drive system operation. Do not use the drive system on sloping paths	Turn off the machine using the Ignition key (KEY)
<b>13 flashes</b>	Key disabled	Temporary absence of voltage on the Ignition key inlet.	Check the Ignition key (KEY) circuit wiring, connections and functions	Turn off the machine using the Ignition key (KEY)
<b>14 flashes</b>	EEPROM fault	Failed software consistency check	Try to reset the machine, if the alarm persists, replace the Drive wheels controller (EB3)	Turn off the machine using the Ignition key (KEY)

## Drive System Gear Motor Current Draw Test



**WARNING:** This procedure must be performed by qualified personnel only and with the help of an assistant.

1. Drive the machine on a level floor.
2. Use a suitable chock to raise one side of the machine approximately 2cm from the floor and allow one drive wheel to turn freely.



**WARNING:** Pay attention to the rotation of the driving wheel when performing the following steps.

3. Apply the amp clamp (A) on the positive cable (red) of the drive harness (B) near the Drive system gear motor.

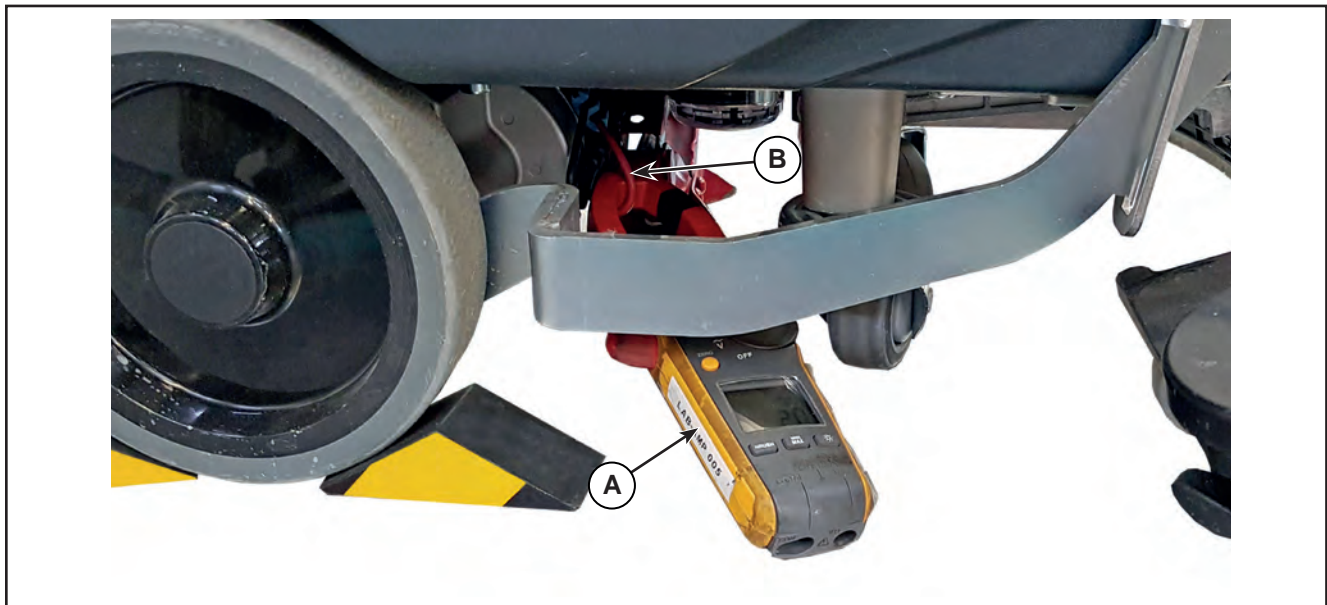


Figure 6:

4. Rotate the Speed adjuster at maximum speed.
5. Switch on the machine and activate the drive motor with at least one hand on the Operator's presence sensor.
6. Check that the current draw is included between 1,5 and 2,5A at 24V.
7. Release the Operator's presence sensor.
8. Switch off the machine and remove the amperometric clamp.
9. If the amperage is higher, perform the following procedures to detect and correct the abnormal amperage:
  - Check if there is dust or debris preventing the wheel rotation.
  - If necessary, disassemble the motor (see "[Drive system gearmotor](#)" paragraph), and check the condition of all its components.
10. If the above-mentioned procedures do not lead to a correct amperage, the gearmotor must be replaced.



## Removal and Installation

### Drive Wheels Controller (EB3)

1. If equipped remove the ignition key, then disconnect the red battery connector.
2. Unscrew the 4 screws and remove the electronic component compartment cover.
3. Unscrew the 2 screws (A) and pull out the Drive wheels controller (B) with his support bracket.
4. Disconnect the following connections:
  - (C) 16 ways J1 MOLEX connector.
  - (D) Grey M2 Drive motor faston
  - (E) Red M2 Drive motor faston.
  - (F) Black B - supply faston.
  - (G) Red B + supply faston.

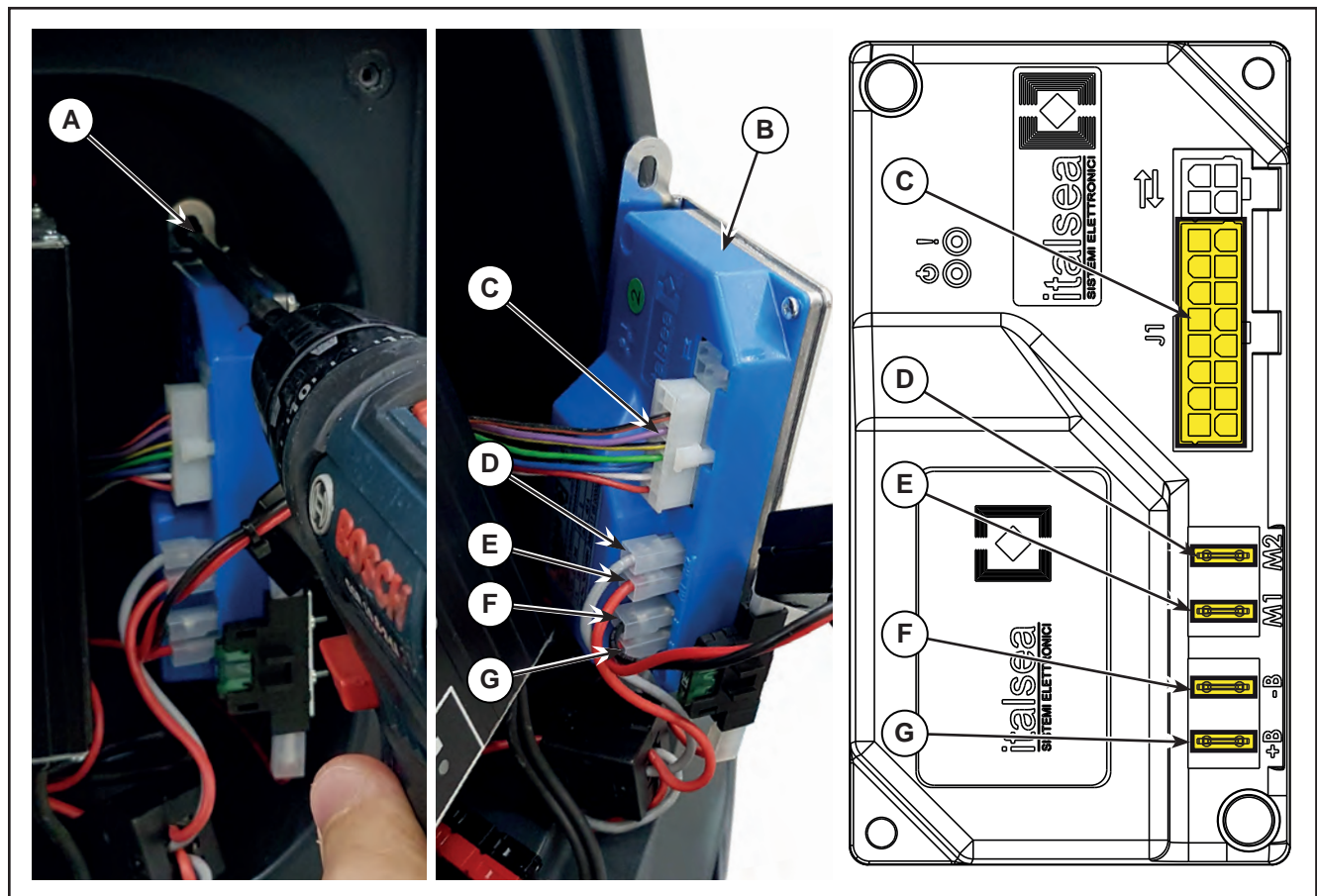


Figure 7:

### Drive Wheels Controller (EB3) (continues)

5. Unscrew the 2 screws (H) and carefully remove the Drive wheels controller (I).

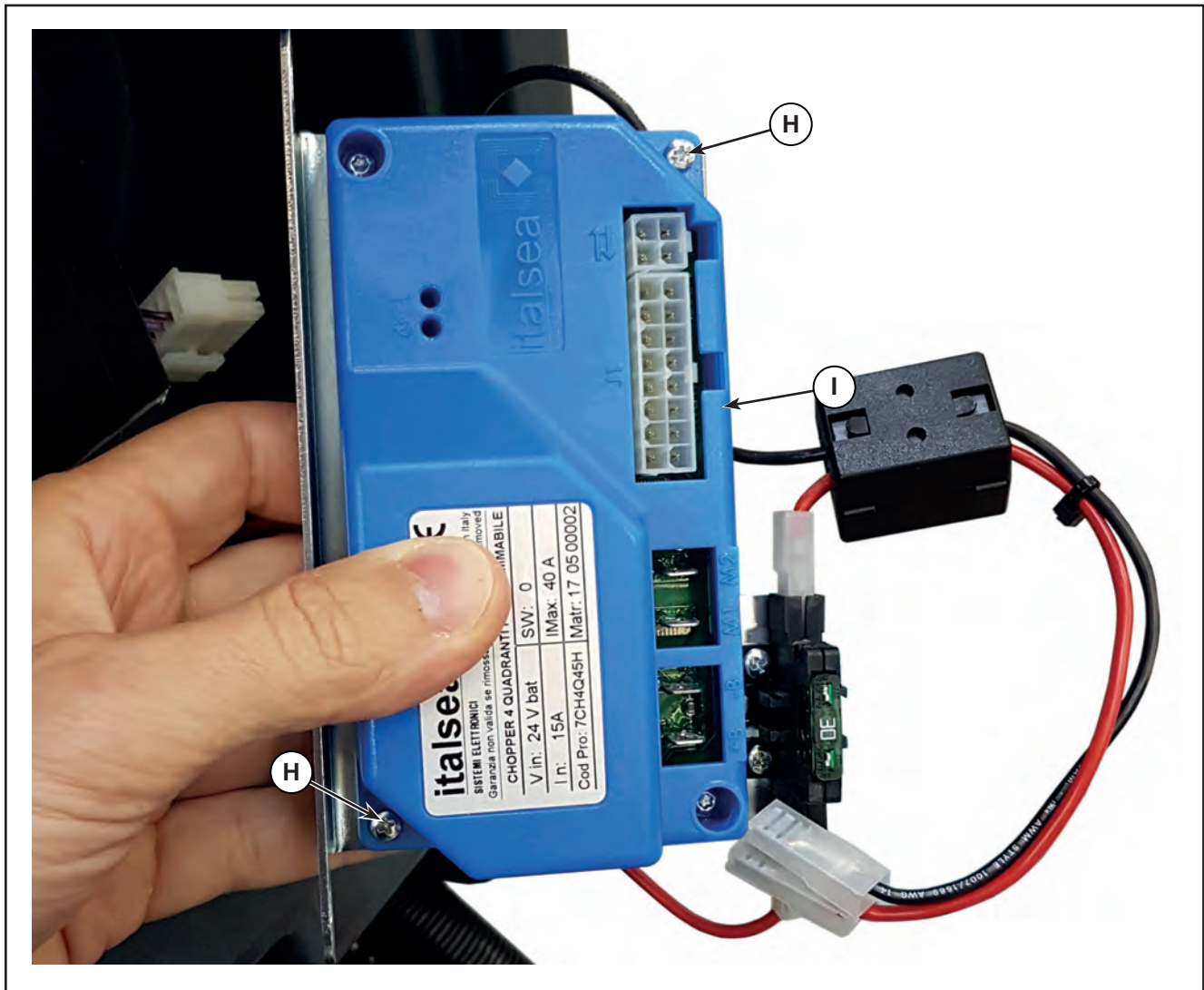


Figure 8:

6. Assemble the components in the reverse order of disassembly.

## Drive System Gearmotor



**WARNING:** This procedure must be performed by qualified personnel only and with the help of an assistant.

1. Drive the machine on a level floor or on a hoisting system to facilitate the disassembly procedures.
2. If equipped remove the ignition key, then disconnect the red battery connector.
3. Remove the squeegee.
4. Lift the recovery tank and remove the batteries.
5. Turn the machine (A) upside down



**CAUTION:** Use suitable protections on the support areas and secure the machine.

6. Remove the 2 covers (B) and unscrew the 2 fastening screws (C), then remove the wheels (D).

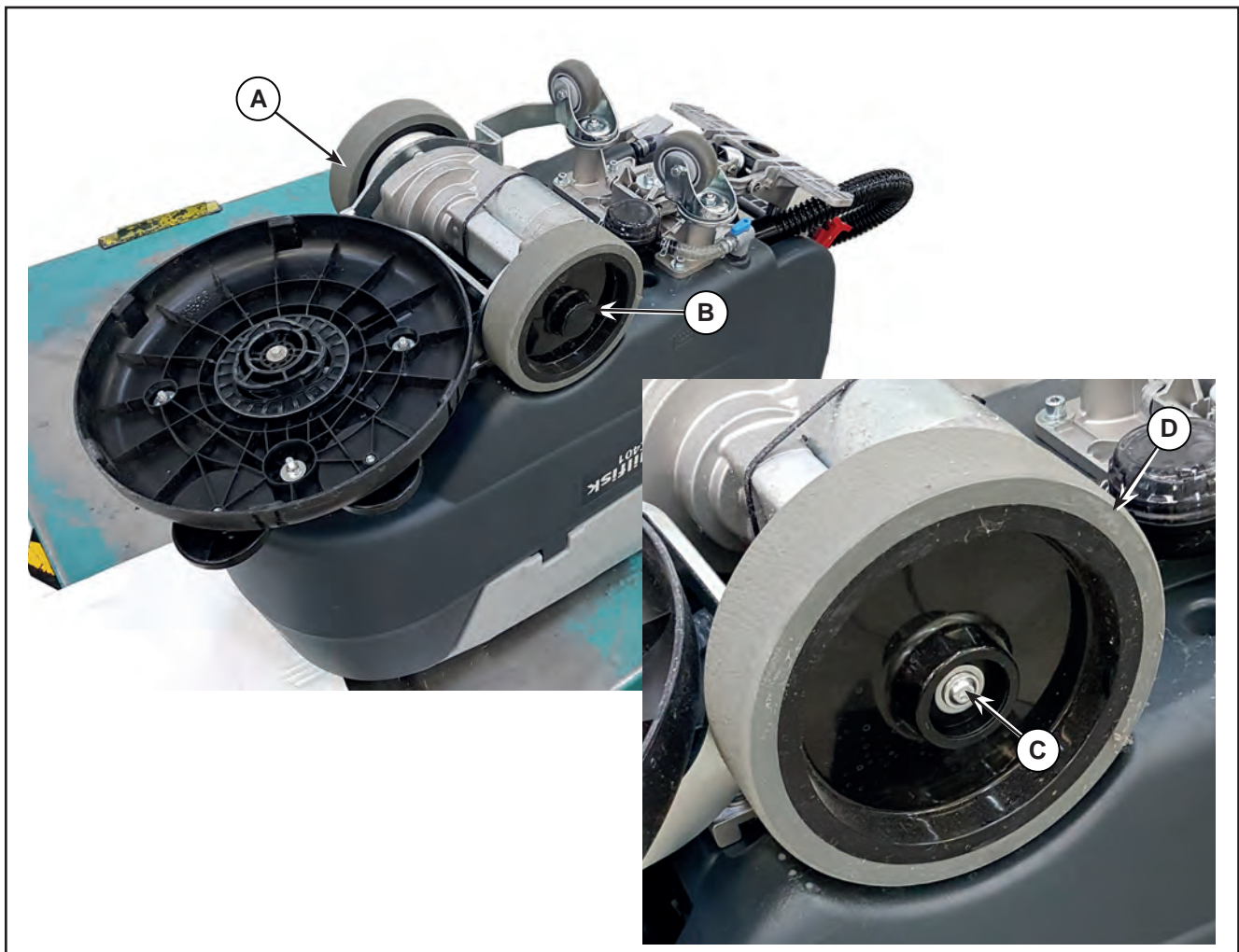


Figure 9:



### Drive System Gearmotor (continues)

7. Retrieve the 2 keys (E), the 2 washers (F) and the 2 circlips (G).
8. Unscrew the 3 screws (H) from the brush deck levers and retrieve the bushings.
9. Remove the clamp (I) and disconnect the Drive system gear motor (J).
10. Unscrew the 4 screws (K) and retrieve the washers, then remove the Drive system gear motor (L).

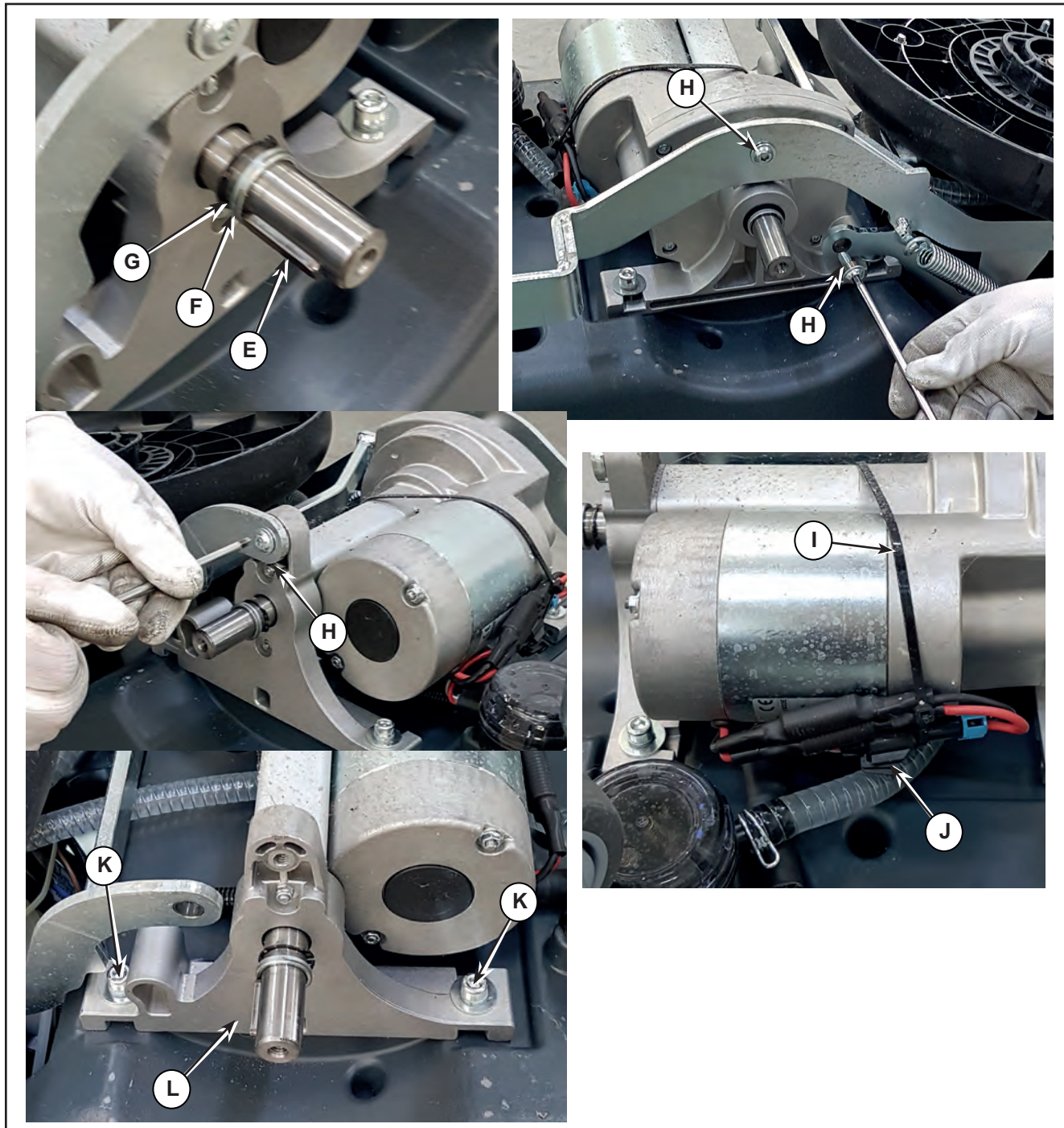


Figure 10:

11. Assemble the components in the reverse order of disassembly.

Specifications

Drive Wheels Controller (EB3) Connectors

FASTON					
PIN	Description	Controller in/out	V ref.	I max.	Connected to
+B	Vbatt +	In	24V	35A	BAT+
-B	Vbatt -	In	0V	35A	BAT-

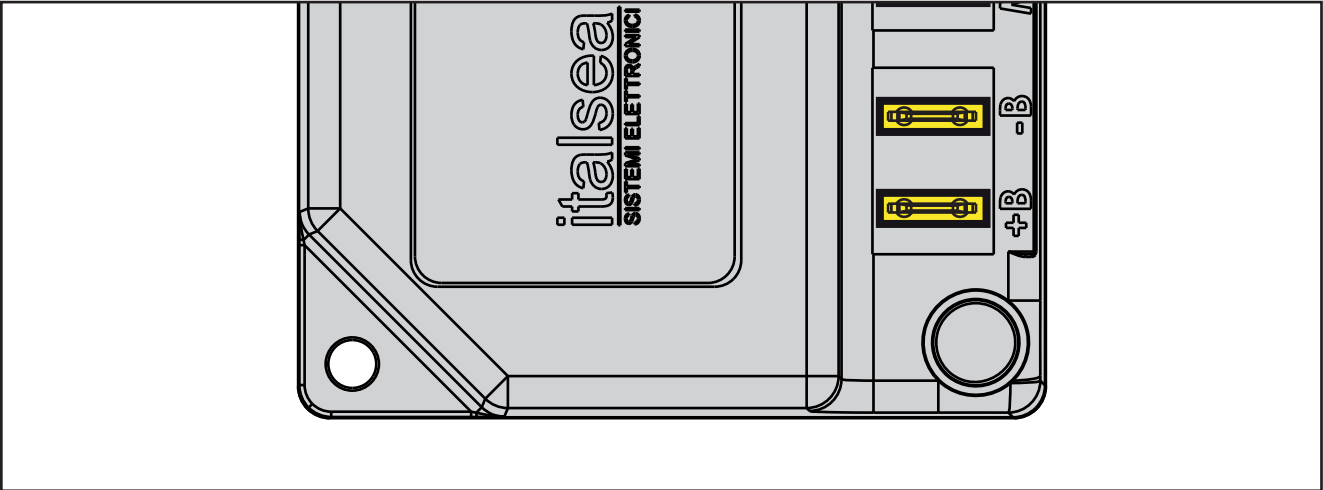


Figure 11:

FASTON					
PIN	Description	Controller in/out	V ref.	I max.	Connected to
M1	Drive output +	Out	0V (15V)	20A	
M2	Drive output -	Out	24V (0V)	20A	

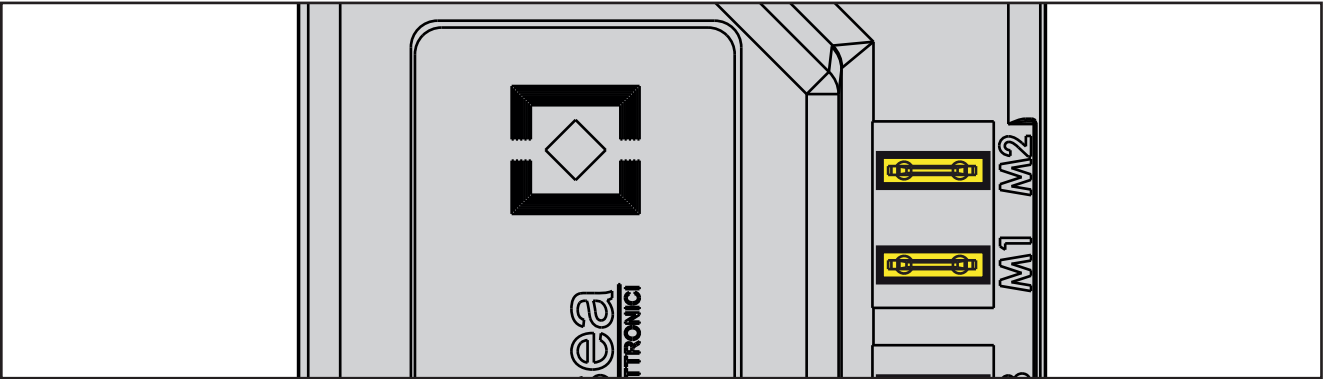


Figure 12:



**Drive Wheels Controller (EB3) Connectors (continues)**

MOLEX MINIFIT					
PIN	Description	Controller in/out	V ref.	I max.	Connected to
1	Brush output + POT. +	Out			RV1.1
2	Brush output - POT. IN	In			RV1.2
3	POT. -	Out			RV1.3
4					
5					
6					
7					
8					
9					
10					
11					
12	Drive enable	In			EB1 D.2
13	Reverse direction	In			SW1
14	Output	Out			SW1
15	Key input	In			KEY
16					

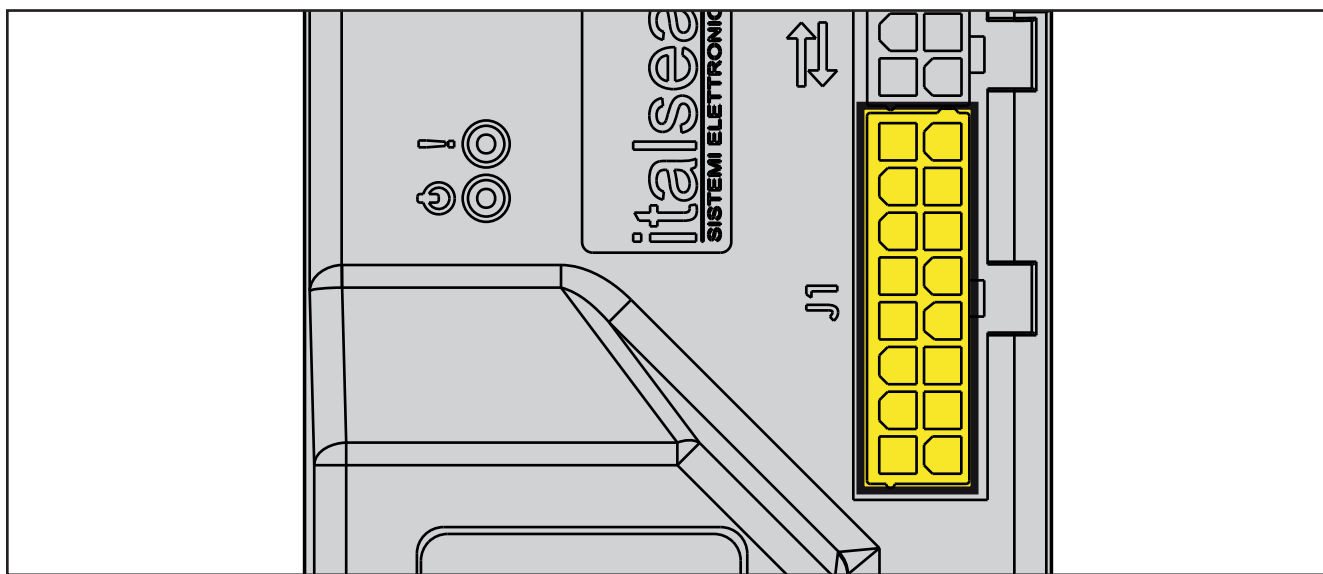


Figure 13:

## Shop Measurements

### Drive Wheels Controller (EB3)

Battery volts at battery, key on = 24.27V

#### Power Supply

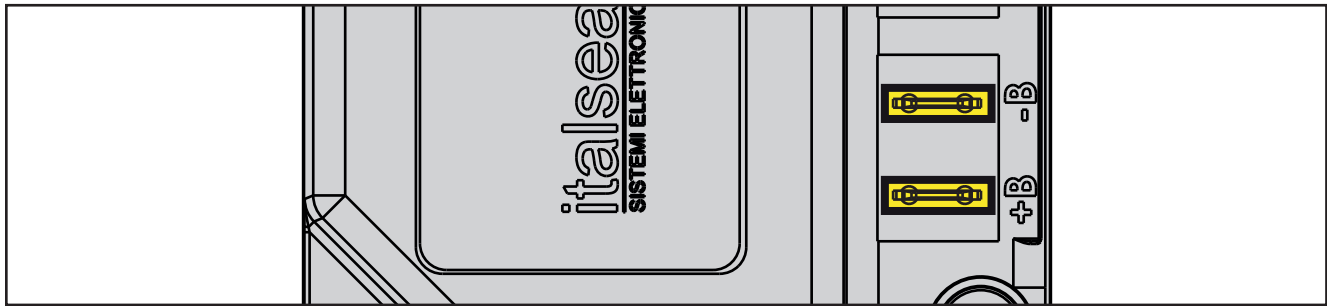


Figure 14:

PIN	Color	Description	Measured	Comments
B+	Red	Main machine controller power supply +	24.15 V	No functions
B-	Black	Main machine controller power supply -	0.00 V	No functions

#### Power Supply

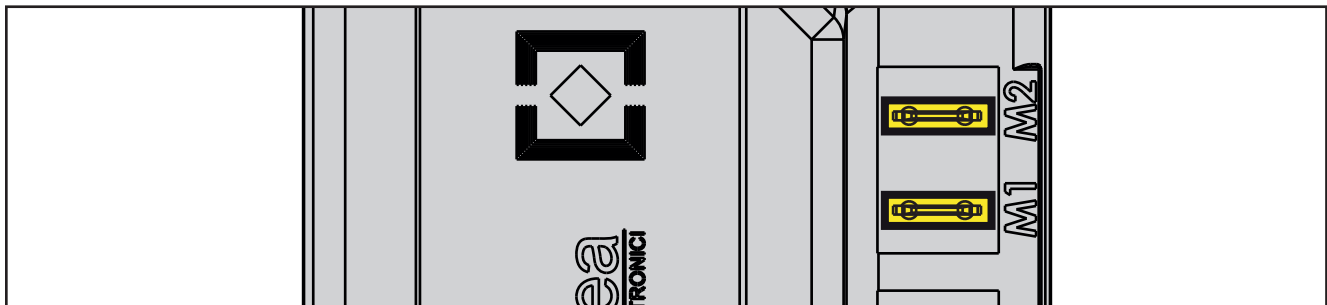


Figure 15:

PIN	Color	Description	Measured	Comments
M1	Red	Main machine controller power supply +	9.05 V (Min)	Forward speed
			17.10 V (Mid)	
			24.07 V (Max)	
			9.05 V (Min)	Reverse speed
			9.15 V (Mid)	
			4.72 V (Max)	
M2	Black	Main machine controller power supply -	9.05 V (Min)	Forward speed
			17.10 V (Mid)	
			24.07 V (Max)	
			9.05 V (Min)	Reverse speed
			14.97 V (Mid)	
			19.42 V (Max)	

## Shop Measurements - Main machine controller (EB1) (continues)

### Power Supply

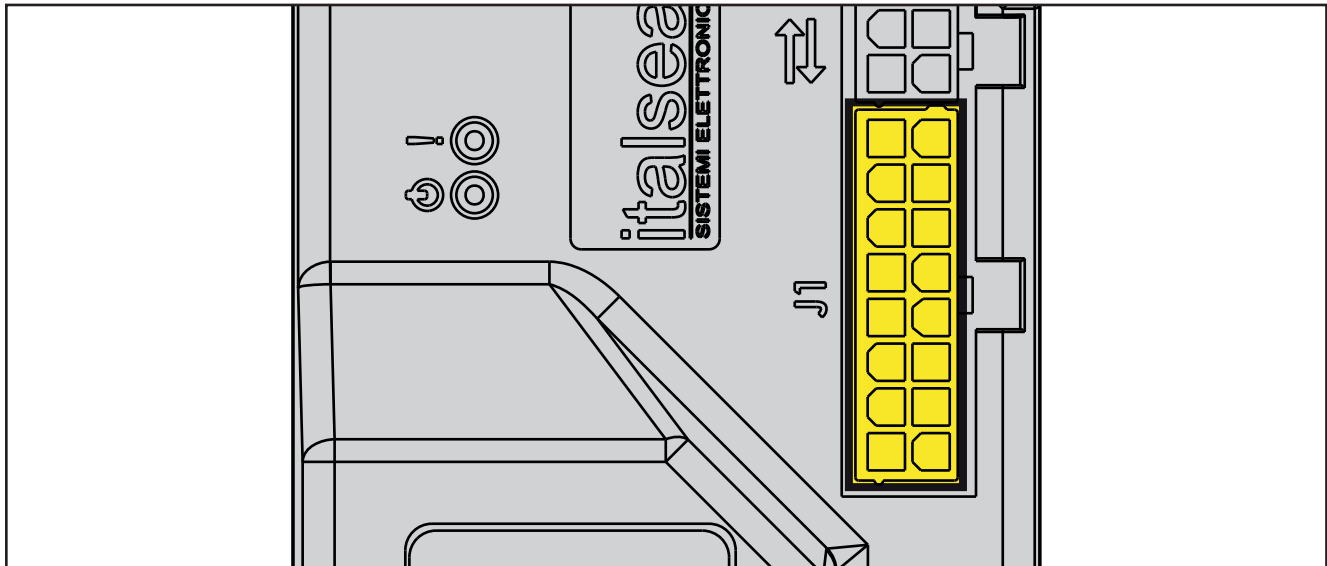


Figure 16:

PIN	Color	Description	Measured	Comments
1	Red	Brush output + POT. +	13.82 V	B-
2	White	Brush output - POT. IN	0 V	Vref PIN 3 -> Min speed
			13.38 V	Vref PIN 3 -> Max speed
3	Blue	POT. -	0.44 V	B-
12	Green	Drive enable	0.0 V (No enable)	B-
			4.95 V (Enable)	B-
13	Black/ Yellow	Reverse direction	0.00 V (No reverse)	B-
			23.26 V (Reverse)	B-
14	Violet	Output	23.35 V (Machine ON)	B-
15	Black/ Orange	Key input	23.72 V (Machine ON)	B-

## Specifications

Description / Model		SC401, SCRUBTEC 344
		Drive
Driving wheel diameter		7.8 in (200 mm)
Driving wheel specific pressure on the floor (*)		116 psi (0,8 N/mm <sup>2</sup> )
Rear wheel diameter		3.1 in (80 mm)
Rear wheel specific pressure on the floor (*)		290 psi (2,0 N/mm <sup>2</sup> )
Drive system gearmotor technical data	Power	0.2 hp (150 W)
	Voltage	24V
	Transmission ratio	13:1
	RPM shaft	110 ±20 rpm
	Protection class	“UL” RECOGNIZED
	Insulation class	F
Drive speed (variable)		0 - 3.1 mi/h (0 - 5 km/h)
Maximum gradient when working		2%

(\*) Machines have been tested under the following conditions:

- Battery maximum size
- Maximum brush and squeegee size
- Full detergent tank
- Optional equipment installed
- Wheel weight checked
- Print on the floor checked on cement for each single wheel
- Result expressed as maximum value for both front and rear wheels

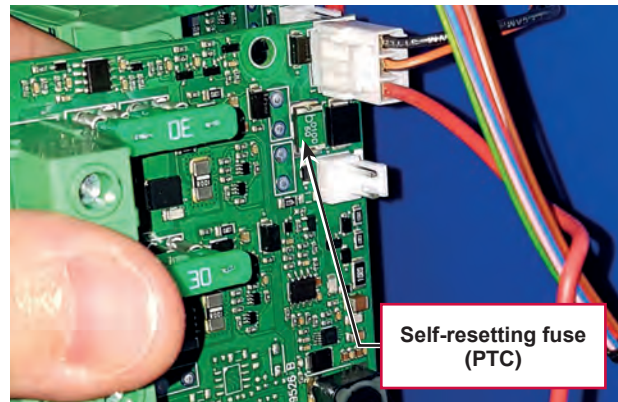
## 24 - Electrical System (Battery)

### Functional Description

The machine electrical system is mainly composed of the following components:

- Battery: lead battery pack with 24V nominal voltage. They are connected to the machine system through the Battery red connector (C1), which has the following functions:
  - Permanently disconnecting the batteries in case of extended interruption of use
  - Outer battery charger connection
  - Emergency stop of all the machine functions (except for charging with the machine battery charger, if present)
- Ignition key (K1) (if present): inhibits the use of all the machine functions (except for charging with the machine battery charger, if present), if turned to 0 or with the key removed.
- Main machine controller (EB1): receives the commands from the User interface controller (EB2) and powers directly all the machine services, except for the electric drive system (if present).
- User interface controller (EB2): it is responsible for the user interface, as it contains all control buttons and the indicator LEDs, and is connected to the two Operator presence sensors (S1, S2) on the handlebars. All information from and for the user is exchanged with the Machine Main Controller (EB1) via I2C protocol.
- Main power relay (ES1): controlled by the Main machine controller (EB1), it powers the electronic board power circuits only after all system safety and integrity conditions have been verified and confirmed when the board is turned on.
- Wheel drive controller (EB3) (if present): it powers the Drive motor (M4).
- Guards: the system is protected against short-circuits and overloads by the following fuses:
  - (F1, 30 Amp): Brush motor circuit fuse
  - (F2, 30 Amp): Vacuum motor circuit fuse
  - (F3, 30 Amp): Electric drive system fuse (if present)
  - (F4, 1 Amp): USB socket circuit fuse (if present)

The low-power circuits not protected by those fuses are protected by the electronic piloting components or by self-resetting fuse (PTC) on the Main machine controller (EB1).



- Machine battery charger (CH) (if present): to recharge the batteries. When it is running, all machine functions are inhibited.




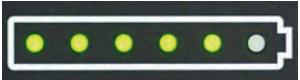

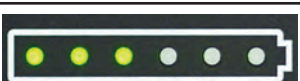
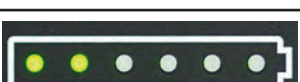

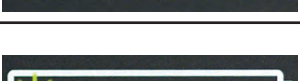
## Battery Charge State Display

### Low Voltage Cut Out

The Main machine controller (EB1) shuts off electrical loads to protect the batteries from damage caused by over discharging.

The voltage threshold where loads are turned off depends on the battery type. See table below.

### Significant Levels for Machine Operation

Level	Battery status LEDs	Voltage in WET setting	Voltage in GEL setting	CONSEQUENCE
		B+ (V)	B+ (V)	
A		>23,5	>23,5	-
B		>23,0	>23,2	-
C		>22,5	>22,9	-
D		>22,0	>22,6	-
E		>21,4	>22,2	-
F		>20,4	>21,6	Little remaining run time, no block
G		<20.4	<21.6	Brush and Vacuum system OFF
		19.0		Drive system OFF

## Wiring Diagram

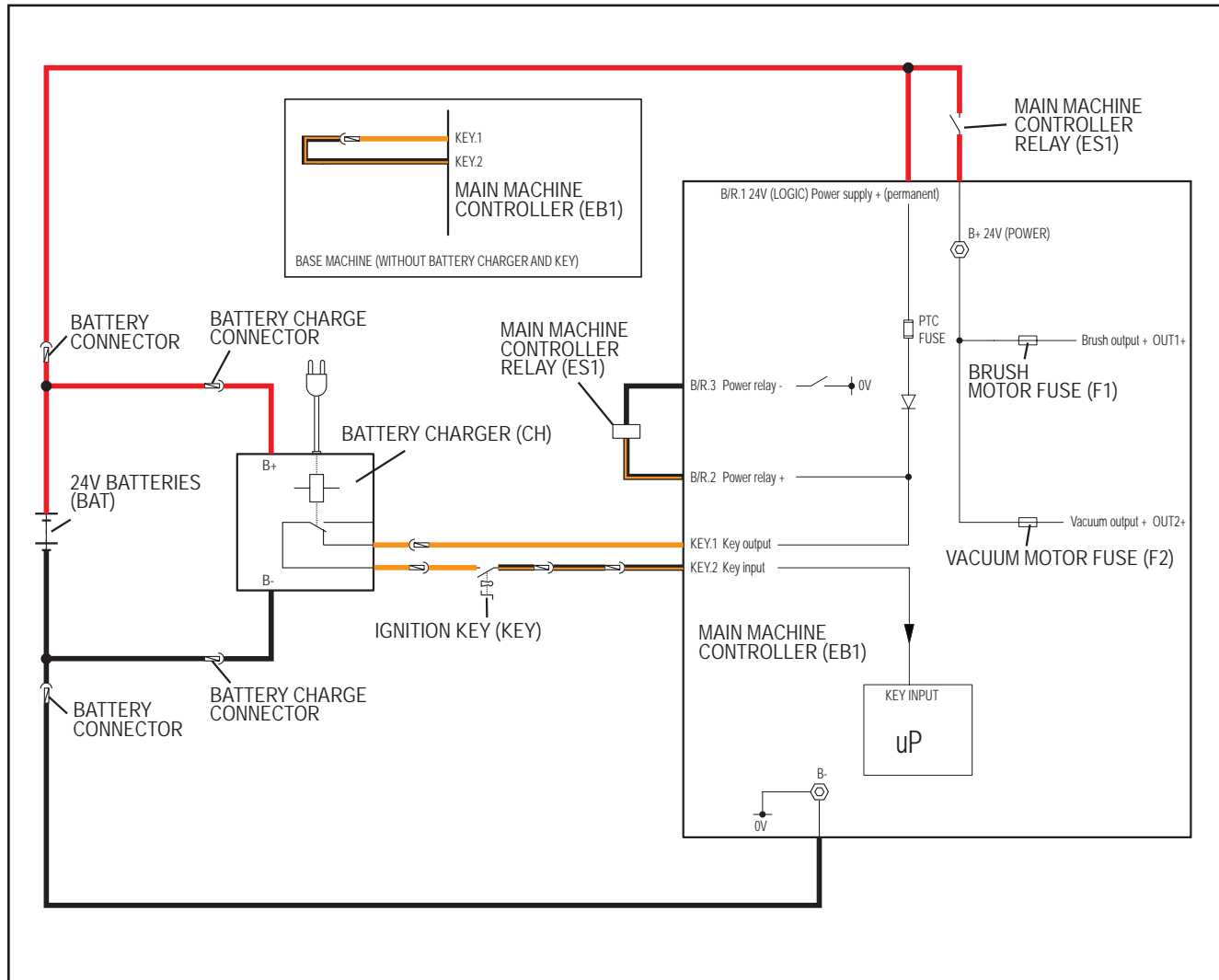


Figure 1:

## Component Locations

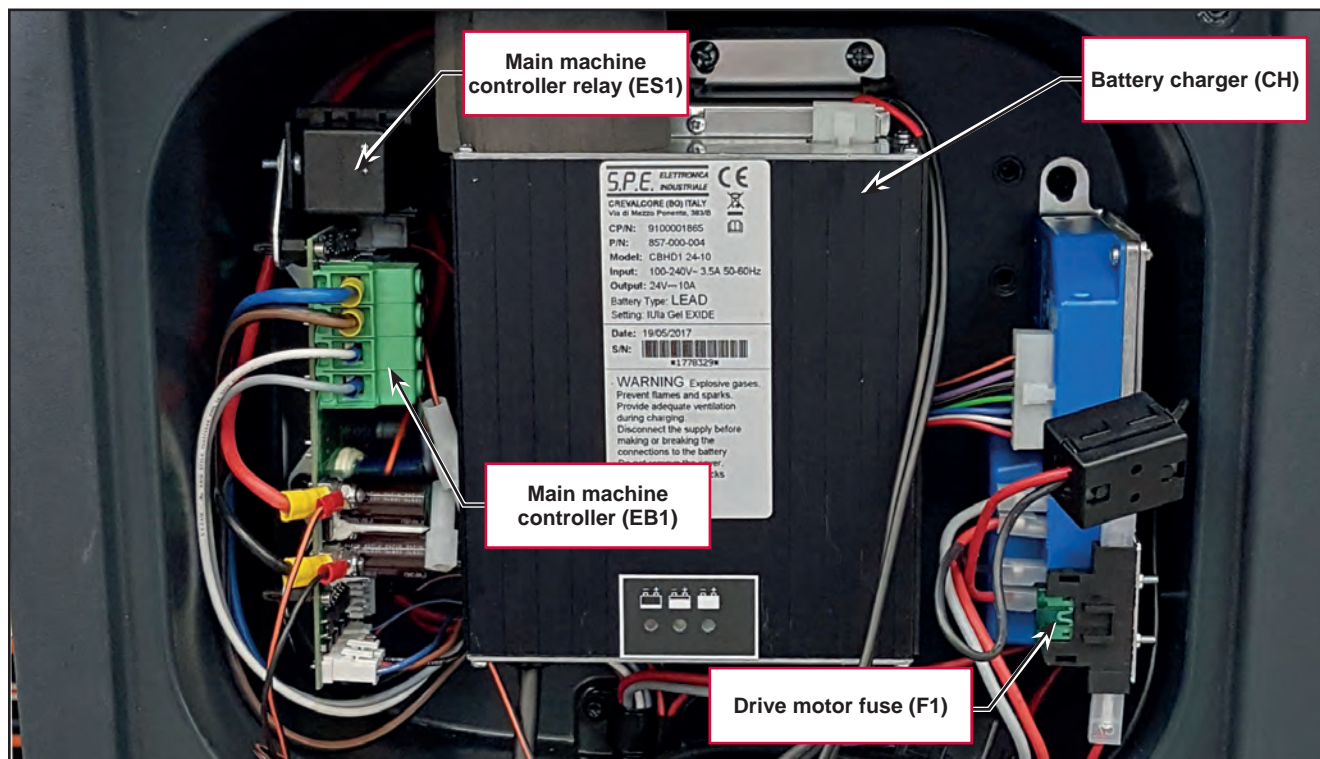


Figure 2:

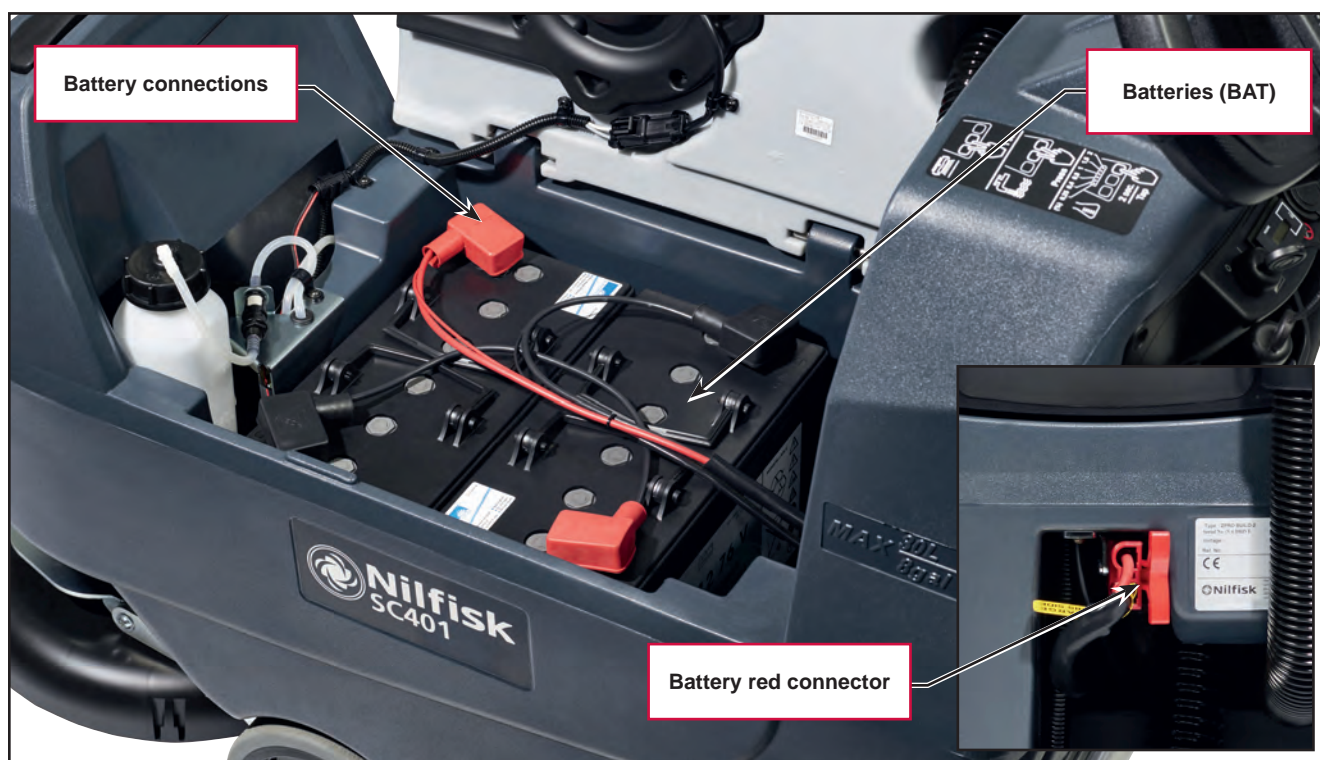


Figure 3:

## Maintenance and Adjustments

### Setting the Installed Battery Type

Set the electronic board of the machine according to the type of batteries installed (WET or GEL) as shown below:

1. (If equipped) Turn the ignition key to “I”.



Press the main push-button to turn on the machine, then detect the current setting by checking in the very first seconds the battery symbol LED flashing.

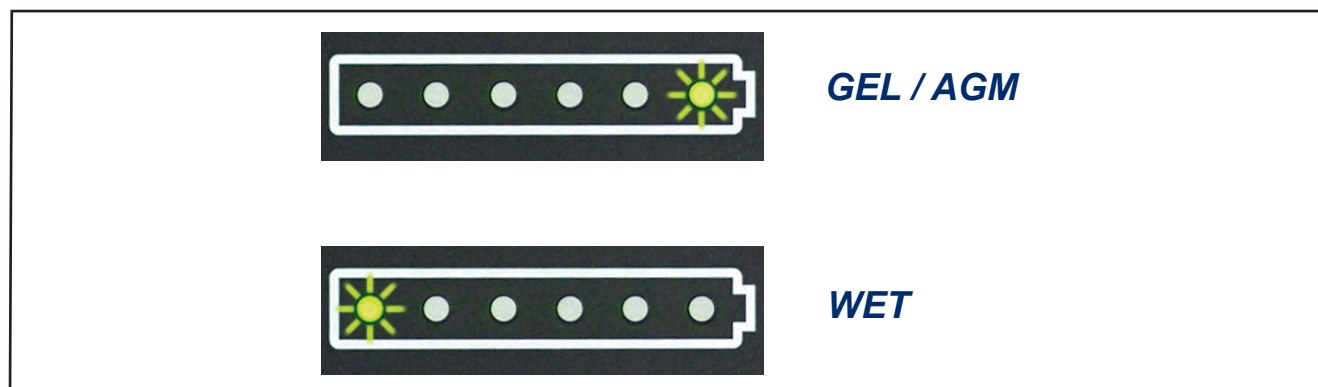




Figure 4:

2. If the setting is to be changed, press the vacuum button  for 3 seconds.
3. Within 3 seconds, shortly press the vacuum button  to select a new setting.
4. Wait 3 seconds for the battery symbol to display the battery charge status.



**Note:** This procedure sets only the low voltage cut out threshold values and not the charging profiles. In order to set the charger see the next procedure.



**WARNING:** In the machines equipped with on-board battery charger, the installed batteries (WET or GEL/AGM) may require a specific charging algorithm. See the next procedure.



## Battery Charger Setting and Dipswitches Configuration

1. If equipped remove the ignition key, then disconnect the red battery connector.
2. Unscrew the 4 screws (A) and remove the electronic component compartment cover (B).
3. Unplug the connection of the on-board battery charger.
4. Unscrew the 4 screws (C) and remove the on-board battery charger (D).

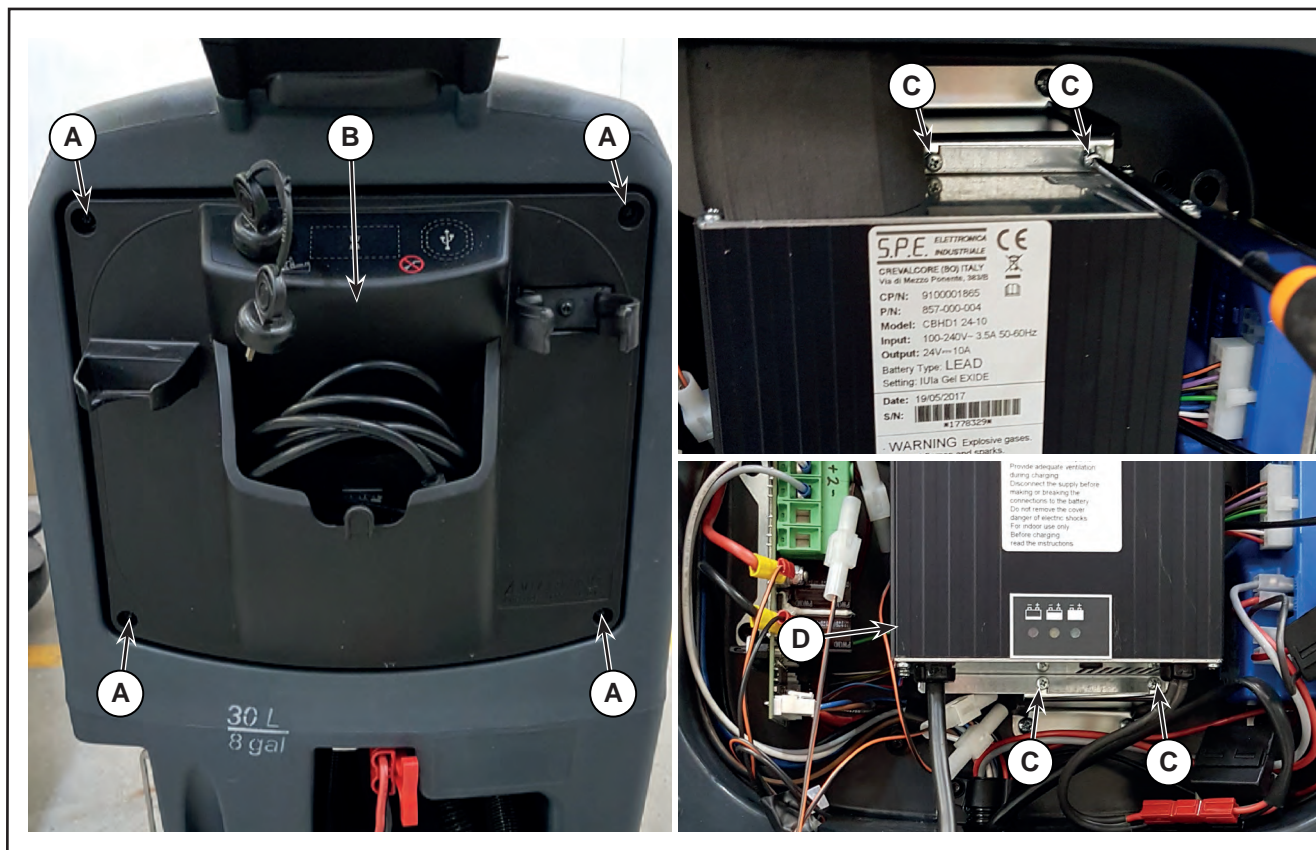


Figure 5:



### Battery Charger Setting and Dipswitches Configuration (continues)

- Remove the round black cap (E) located close to the openings on the bottom of the charger, using a tool like a screwdriver.

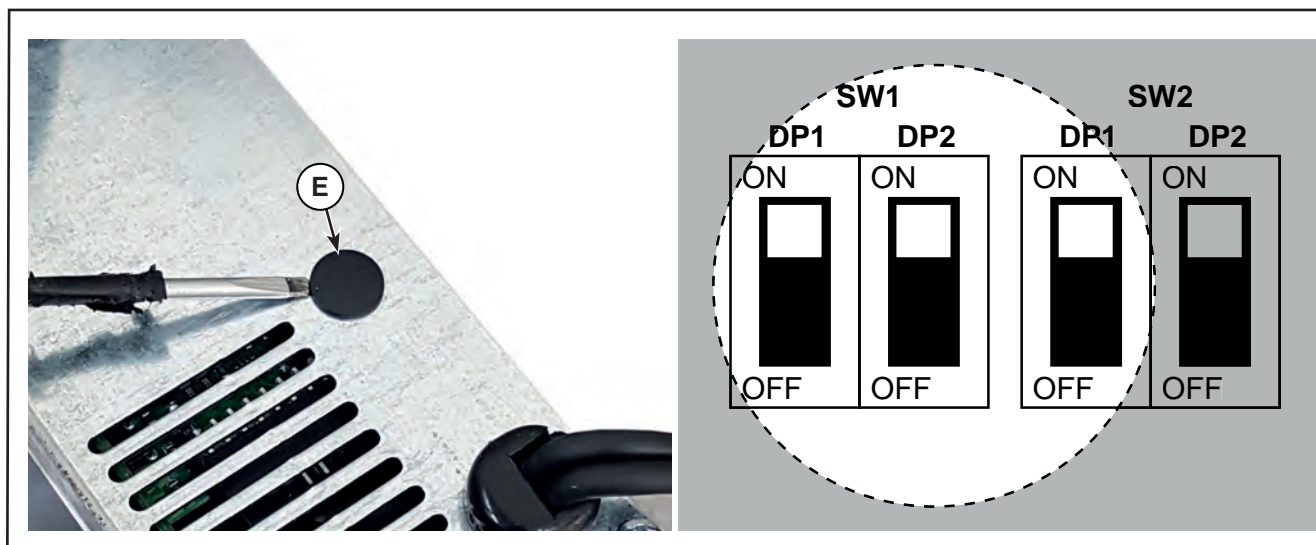
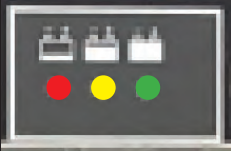


Figure 6:

- Change the dipswitch configuration as the tabel below:

SW1		SW2	BATTERY CHARGER LEDs CODE (*)	CHARGING CURVE
DP1	DP2	DP1		
				
ON	ON	ON	2 flashes of RED	Acid for Lead-acid (Wet) batteries
ON	ON	OFF	2 flashes of GREEN	Gel for generic Gel and AGM batteries
ON	OFF	ON	2 flashes of RED and GREEN	AGM for DISCOVER AGM batteries
ON	OFF	OFF	2 flashes of YELLOW and GREEN	OPTIMA for OPTIMA batteries
OFF	ON	ON	2 flashes of YELLOW	Gel for EXIDE SONNENNSCHEIN Gel batteries (DEFAULT)
OFF	ON	OFF	2 flashes of RED and YELLOW	AGM for FULLRIVER AGM batteries

(\*) The LED CODE is shown by the battery charger status LEDs every time the charger is powered on, before to start the charging cycle.

SW2 DP2	CHARGING CURRENT	COMMENTS
ON	10A	DEFAULT
OFF	8A	To be used for batteries smaller than 50 Ah

- Assemble the components in the reverse order of disassembly.
- Connect the charger plug to mains to check the proper LED CODE.

## Battery Installation

1. If equipped remove the ignition key, then disconnect the red battery connector.
2. Lift the recovery tank cover and check that it is empty; if not, empty it using the drain hose.
3. Grasp the handle and carefully lift the recovery tank.
4. The machine is supplied with cables suitable to install two 12 V batteries.
5. Carefully lift the batteries up to the compartment, then install them correctly.
6. Route and install the battery cables as shown in the diagram, then tighten the nut on each battery terminal.
7. Place the protection cap on each terminal, then connect the red battery connector.
8. Carefully lower the recovery tank.
9. Perform a complete battery charging cycle.

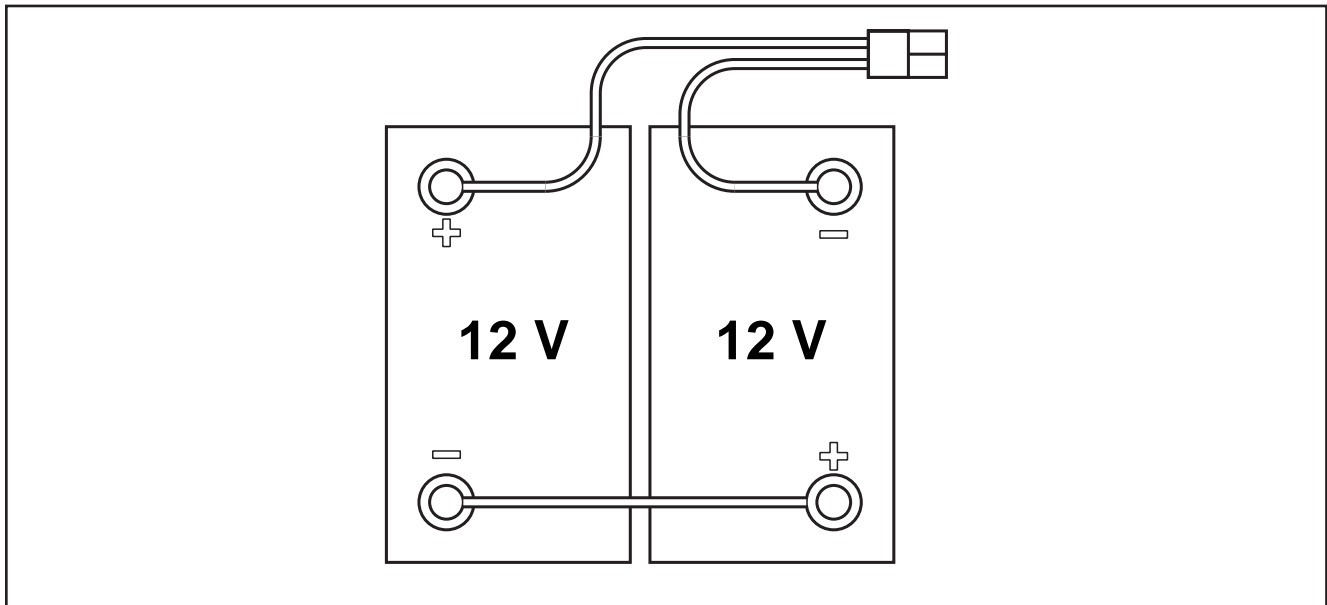


Figure 7:

## Battery Charging



**Note:** Charge the battery when only one LED of the battery symbol is flashing, or at the end of each shift. Keeping the batteries charged make their life last longer.



**CAUTION:** When the batteries are discharged, charge them as soon as possible, as that condition makes their life shorter. Check for battery charge at least once a week.



**CAUTION:** If the machine is not equipped with on-board battery charger, choose an external battery charger suitable for the type of batteries installed.



**WARNING:** When using lead (WET) batteries, battery charging produces highly explosive hydrogen gas. Charge the batteries in well-ventilated areas and away from naked flames. Do not smoke while charging the batteries. Keep the recovery tank lifted until the battery charging cycle is over.



**WARNING:** Pay careful attention when charging lead batteries (WET) as there may be battery fluid leakages. The battery fluid is corrosive. If it comes in contact with skin or eyes, rinse thoroughly with water and consult a physician.

1. Raise the recovery tank.
2. (For WET batteries only) Check the level of electrolyte inside the batteries. If necessary, unscrew the caps and top up.
3. When the correct level is restored, close the caps and clean the tops of the batteries.

## Charging the Batteries with an External Battery Charger

1. Check that the external battery charger is suitable by referring to the relevant Manual. The external battery charger voltage rating must be 24 V.
2. Disconnect the red battery connector (A) which is fitted with a handle, and connect it to the external battery charger.
3. Connect the external battery charger to the electrical mains.
4. After charging, disconnect the external battery charger from the electrical mains and from the battery connector.
5. Connect the red battery connector (A) to the connector (B) fixed to the machine.



**WARNING:** Never connect the external battery charger to the opposing part of the connector (B) fixed to the machine. The electronic system could be irreparably damaged.

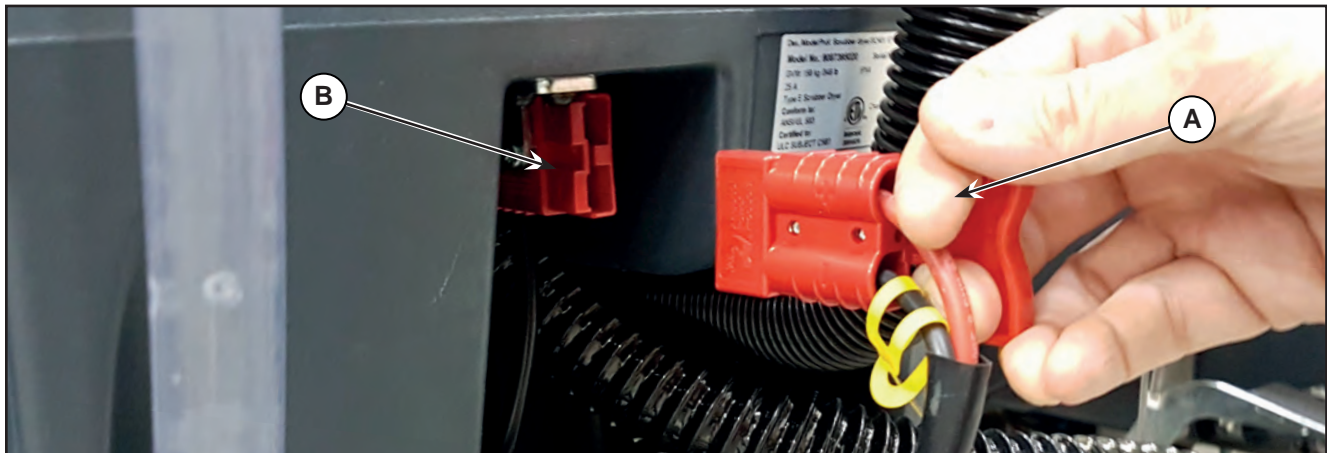


Figure 8:

## Battery Charging (continues)

### Battery Charging with On-Board Battery Charger Installed on the Machine

1. Connect the on-board battery charger cable to the electrical mains. Electrical mains voltage and frequency must be compatible with the on-board battery charger values shown on the machine serial number plate.



**Note:** When the on-board battery charger is connected to the electrical mains, all machine functions are automatically cut off.

2. If the RED LED (A) on the on-board battery charger inspection window stays on, the on-board battery charger is charging the batteries.
3. When the YELLOW LED (B) turns on, the battery charging cycle is nearly completed.
4. When the GREEN LED (C) turns on, the battery charging is completed.

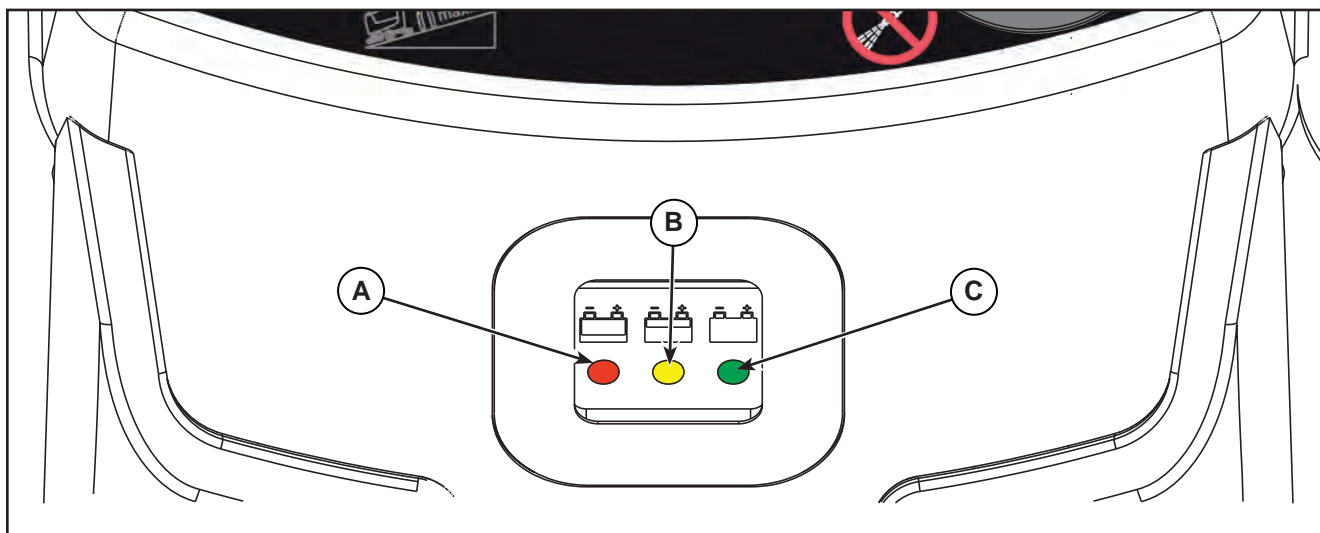


Figure 9:

5. When the battery charging is completed, disconnect the on-board battery charger cable from the electrical mains and wind it round its housing.



**Note:** For further information about the on-board battery charger operation, see the relevant Manual.



## Checking/Replacing Relay or Fuses

1. If equipped remove the ignition key, then disconnect the red battery connector.
2. Unscrew the 4 screws and remove the electronic component compartment cover.
3. Check/replace the following Relay or Fuses:
  - (ES1) Relay 24V - Main machine controller relay (A).
  - (F1) 30A blade fuse - Drive motor fuse (B).
4. Unscrew the 2 screws (C) and pull out the Main machine controller (D) with his support bracket to check/replace the following Fuses:
  - (F2) 30A blade fuse - Brush motor fuse (E).
  - (F2) 30A blade fuse - Vacuum motor fuse (F).

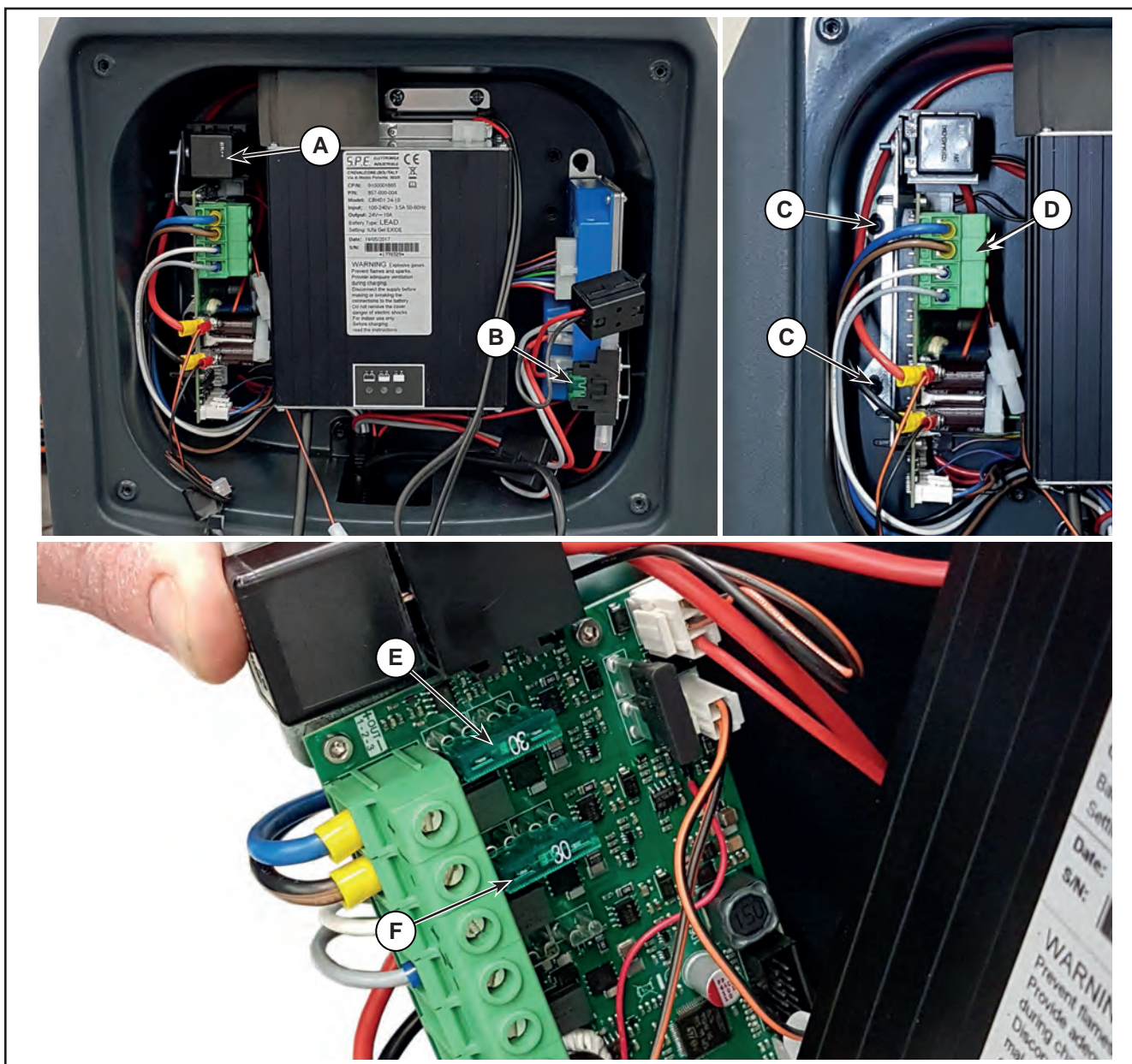


Figure 10:



## Troubleshooting

See the other chapters for previously provided instructions for other electrical system components.

Trouble	Possible Causes	Remedy
The machine is not working	The batteries (BAT) flat or connections sre faulty	Charge the batteries or clean the connections
	The batteries (BAT) are broken	Check the battery no-load voltage
	The relay (ES1) is broken	Replace
	The on-board battery charger (CH) is broken	Replace
	The wiring harness is cut or pressed or short circuited	Repair



**Note:** A damage to the on-board battery charger or its connections can prevent the machine from operating properly.

## Complete Wiring Diagram (Battery no Drive)

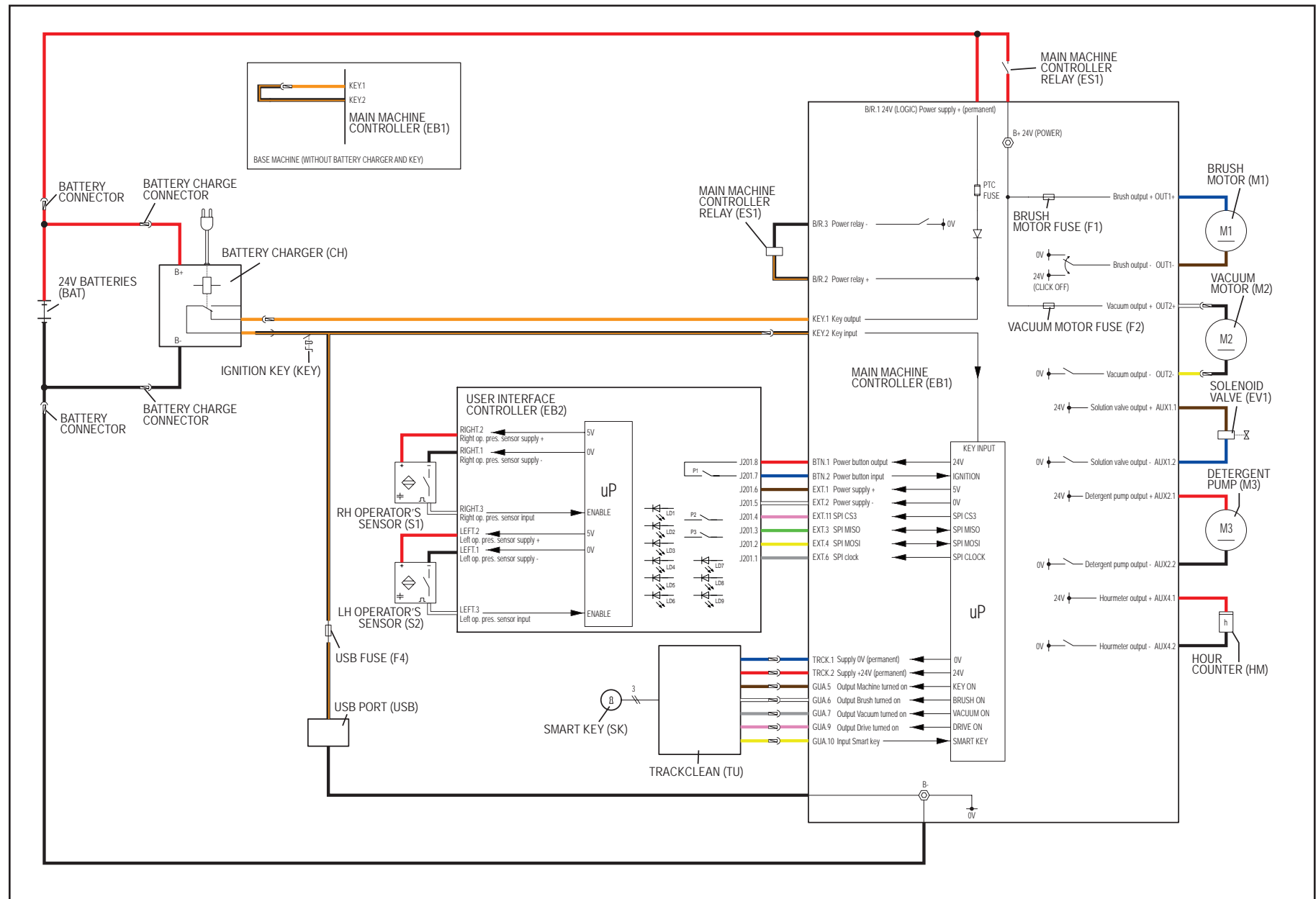


Figure 11:

## Complete Wiring Diagram (Battery Drive)

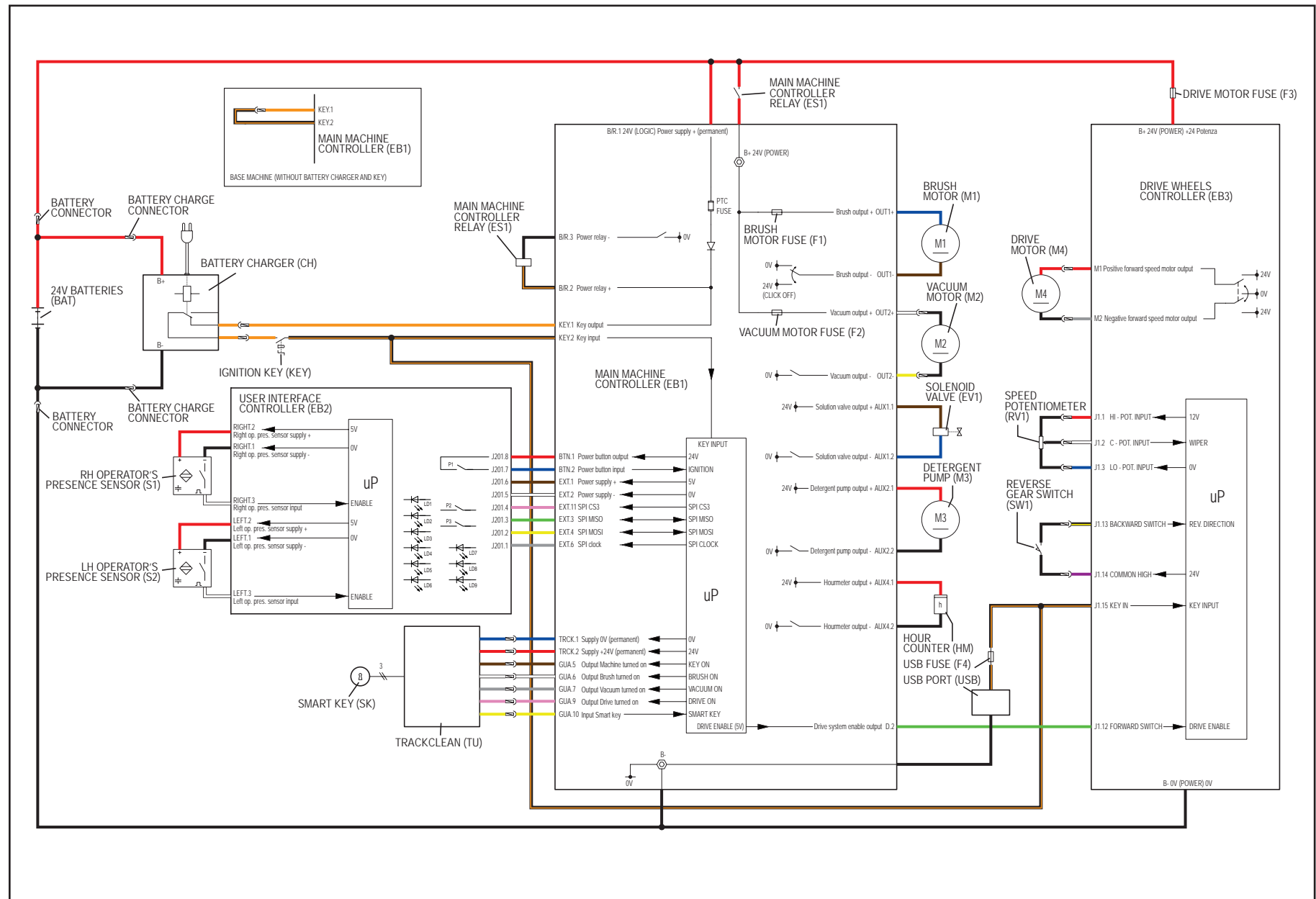


Figure 12:

## Specifications

Description / Model		SC401 / SCRUBTEC 344
IP protection class		X4
Protection class (electric)		III (I for on-board battery charger)
Battery compartment size		13,8 x 13,8 x 10,2 in (350 x 350 x 260 mm)
Standard batteries (q.ty 2)		Advance: 98 Ah C20 GEL / 105 Ah C20 WET Nilfisk: 12V-76 Ah GEL MONOBLOC
Standard battery run time (standard batteries) (EN 60335-2-72)		2,5 h
On-board battery charger	Input voltage	100-240 Vac, 50-60 Hz, 3.5A
	Output voltage	24V 10A
	Efficiency	> 90%
	Efficiency	> 85%
	Output ripple	< 150 mV
	Min. Vbatt	2V
	Case protection	IP20

## ***24 - Electrical System (Cord)***

---

### ***Functional Description***

The machine electrical system is composed of the following components:

- Power supply cable with dedicated mains plug.
- Main switch (SW1): turns the machine on and off.
- Main machine controller (EB1): receives the commands from the User interface controller (EB2) and powers directly all the machine services.
- User interface controller (EB2): it is responsible for the user interface, as it contains all control buttons and the indicator LEDs, and is connected to the two Operator presence sensors (S1, S2) on the handlebars. All information from and for the user is exchanged with the Machine main controller (EB1) via I2C protocol.



## Troubleshooting

See the other chapters for previously provided instructions for other electrical system components.

Trouble	Possible Causes	Remedy
The machine is not working	The power supply cable or plug is broken	Replace the cable
	The Main switch (SW1) is broken	Replace

## Complete Wiring Diagram (Cord)

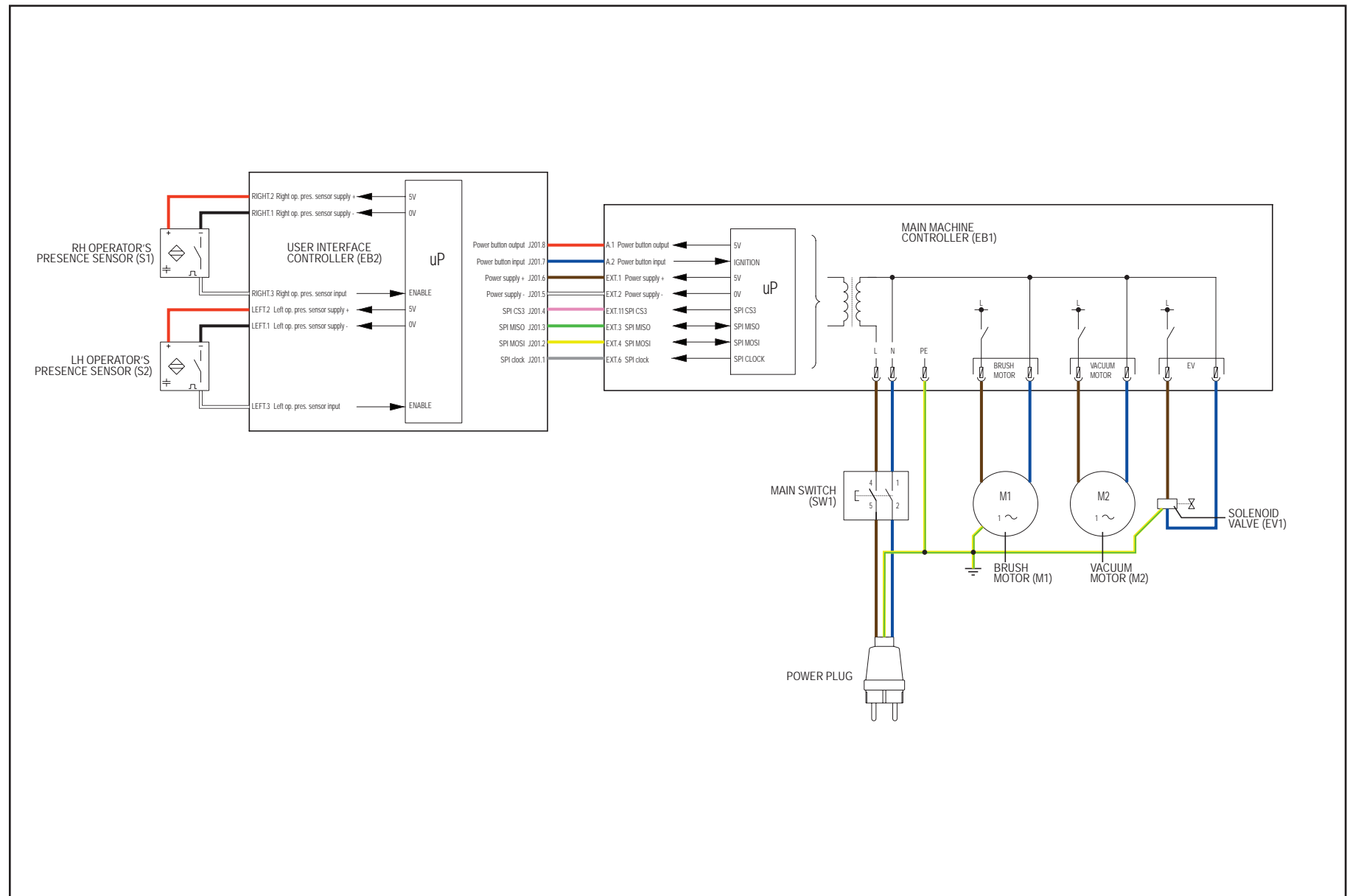


Figure 1:

## Specifications

Description / Model	SC401 / SCRUBTEC 344
Total power draw (EN 60335-2-72)	1.0 kW
IP protection class	X4
Protection class (electric)	I
Power supply	230 V - 50/60 Hz

## 30 - Solution System

### Functional Description

The solution system supplies water and detergent to the brush when cleaning the floor. The water tank is also the main machine body. There is a manual valve on the right side of the tank to close the water supply whenever maintenance must be performed on the machine. The solution flows from the tank to the tap, through the filter and solenoid valve (EV1) and then to the brush deck.

The detergent pump (M4), present on Detergent systems, controls the flow of detergent from the bottle which is then transported to the flow in the main tube just before the solution enters the brush deck (see [“Adjusting of detergent concentration in the washing water”](#) paragraph).

Located centrally, below the tank, there is also a hole for draining any liquid in the battery compartment.

The solution flow is regulated by various timed ON / OFF cycles, according to the water flow rate regulation (0 - 3)

The detergent pump follow different ON / OFF timings depending on flow rate set and detergent percentage setting.

The solenoid valve and detergent pump operate only with the following inputs/conditions:

- Brush function on
- Operator's presence sensors activated
- Battery level not in condition with blinking LED.

### Pre Wetted

To avoid marks or lines on delicate floors, use the “pre wetted” function, which dampens the brush before starting the operation.

When the Brush and the Vacuum system are disabled, if the Main button  and the Solution button



are pressed together for more than 1 sec., the Solution Valve (EV1) output is powered at 24Vdc until



the Main button  and/or the Solution button  are released. During output enabling, all other inputs are inhibited. During output enabling the Solution button LED's are blinking.

## Adjusting of Detergent Concentration in the Washing Water

The system for mixing the detergent in the washing water is automatically activated when the brush is running.

The percentage of detergent added to the washing water is set to 0,25%, to change the setting perform



press the Solution button  for more than two seconds to perform the adjustment. The set percentage depends on the relevant LED turned on, on the battery symbol.



Figure 1:

To change the setting or to reset it (all LEDs off), press Solution button  to set the percentage.



**Note:** The setting is stored 3 minutes after releasing all push-buttons. Detergent percentage setting is stored into memory, even if the machine is switched off.



## Wiring Diagram

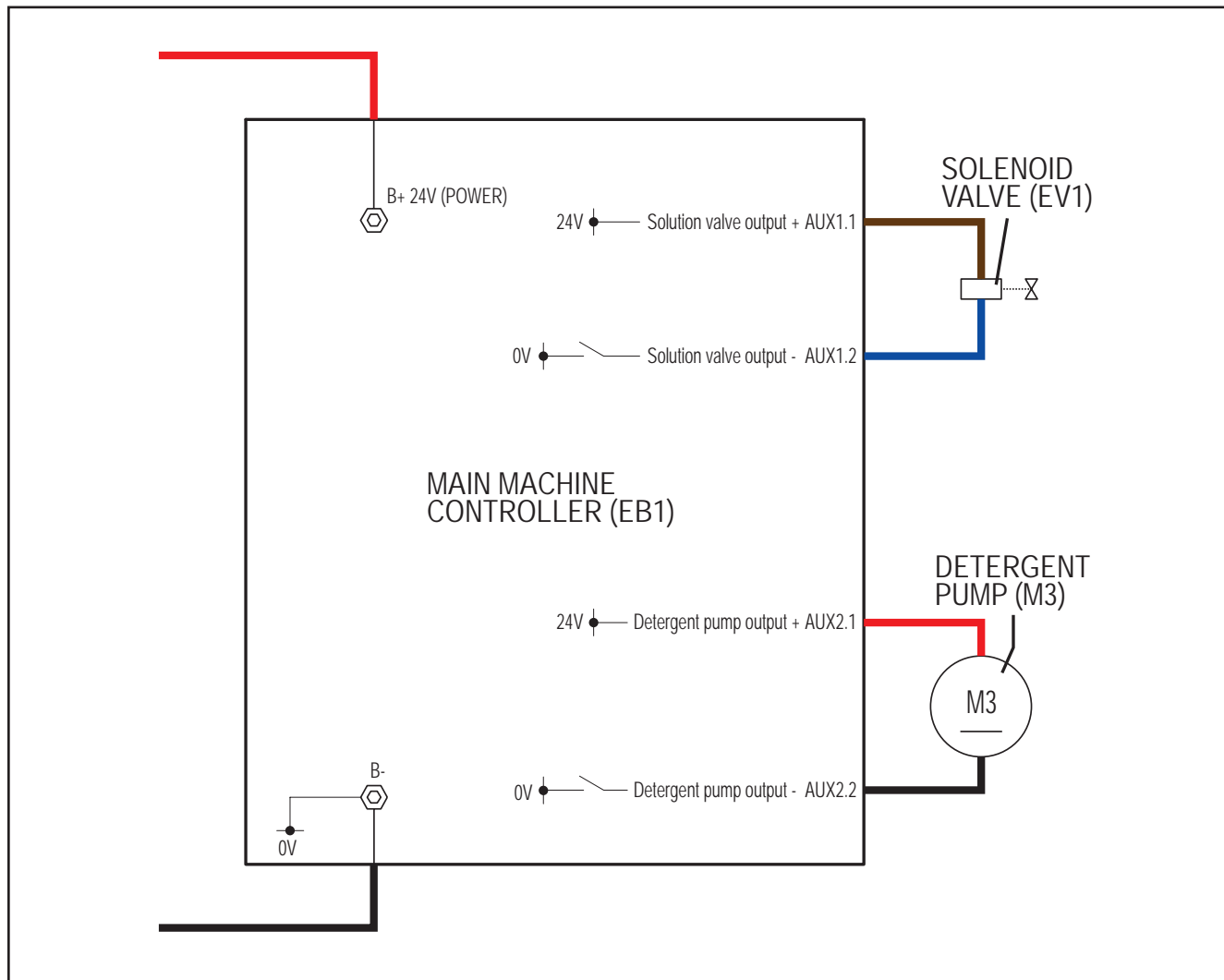


Figure 2:

## Component Locations



Figure 3:

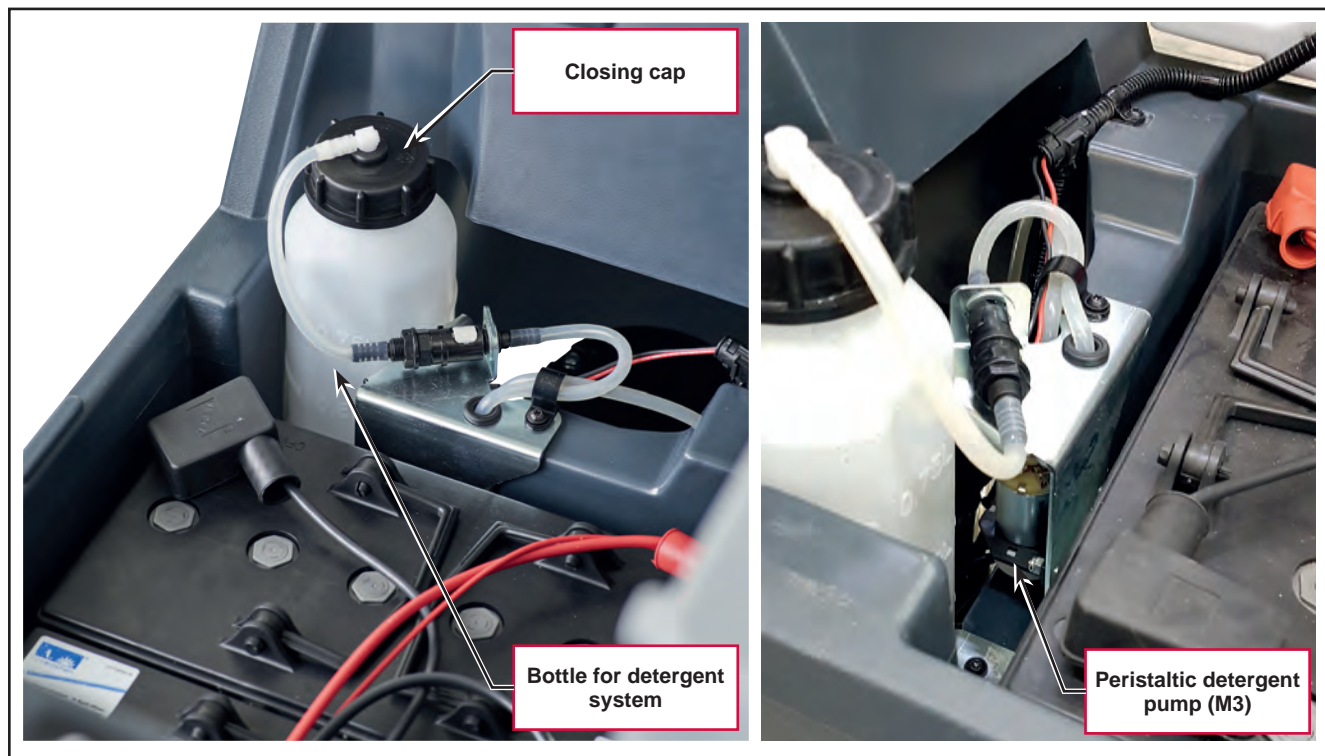


Figure 4:

## Component Locations (continues)

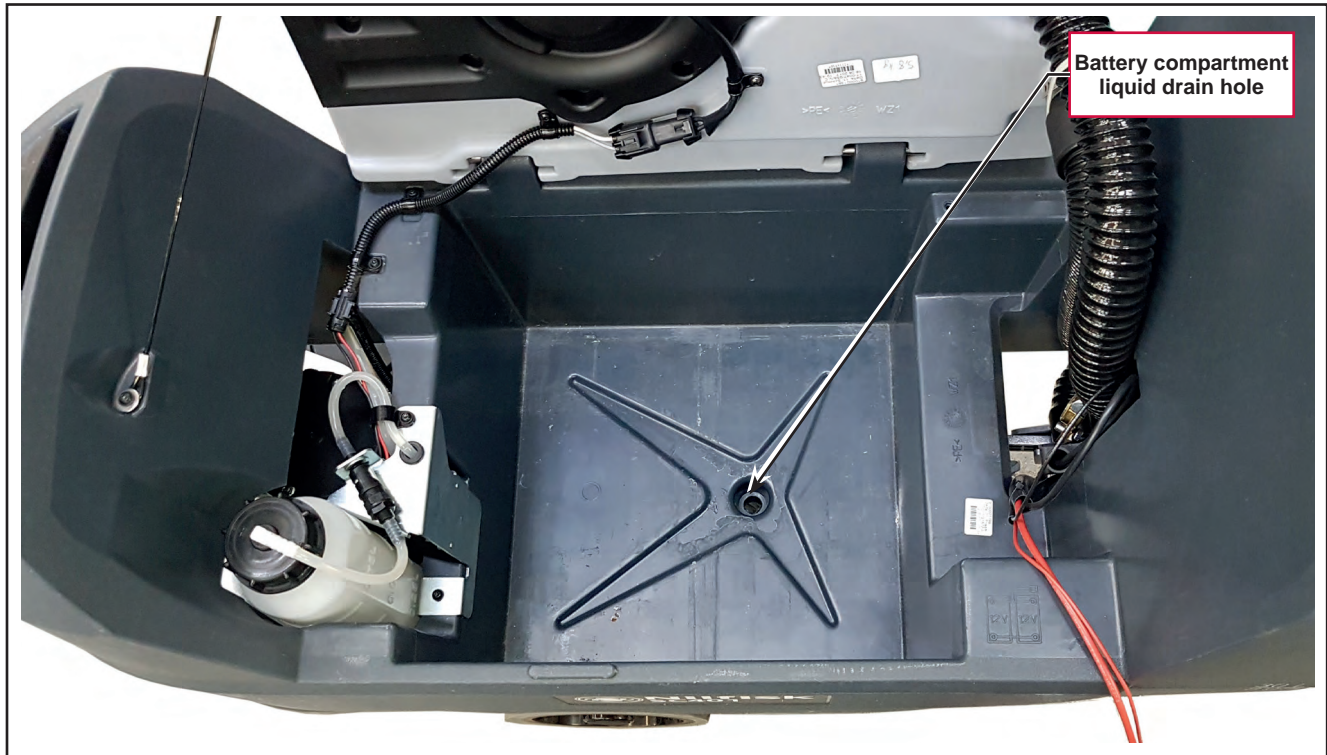


Figure 5:

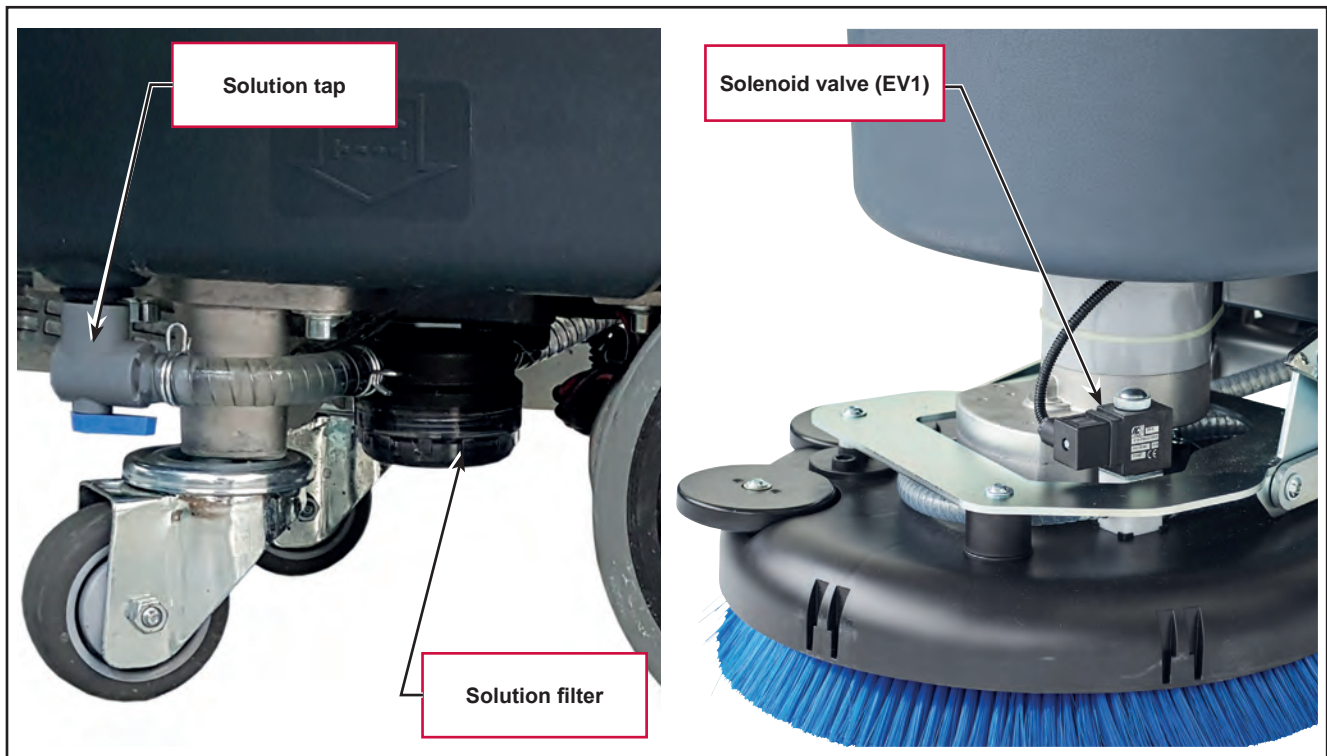


Figure 6:



## Maintenance and Adjustments

### Cleaning the Water Tank and Filter

1. Drive the machine on a level floor.
2. If equipped remove the ignition key, then disconnect the red battery connector.
3. Drain the water tank with the level hose. Then, rinse the tank with clean water.
4. Close the detergent solution tap (A). The tap (A) is closed when it is in position (B).
5. Remove the transparent cover (C) and the gasket (D), then remove the filter strainer (E). Wash and rinse them, then refit them carefully onto the filter support (F).
6. Open the valve (A).

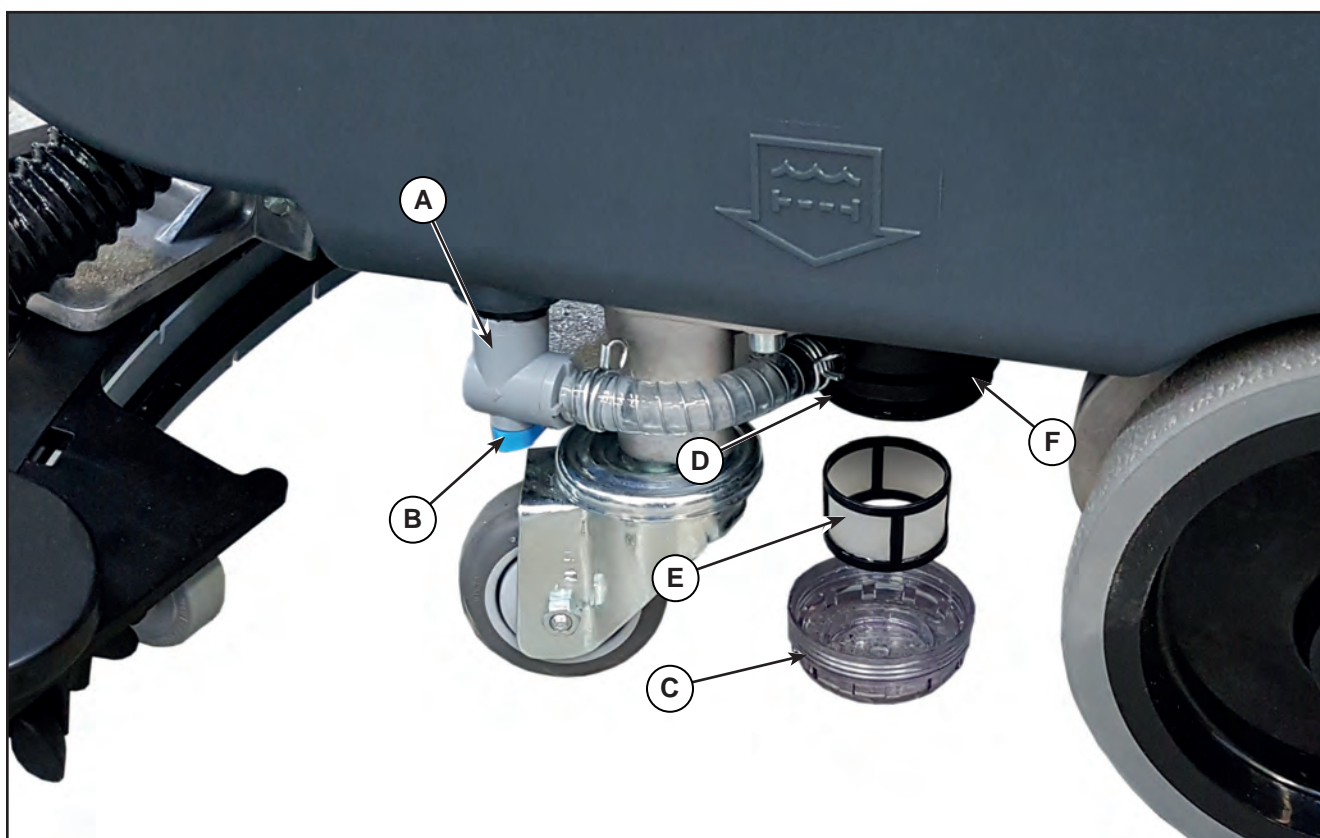


Figure 7:

## Detergent Tank and Detergent System Cleaning

1. Drive the machine to the appointed disposal area.
2. If equipped remove the ignition key, then disconnect the red battery connector.
3. Lift the recovery tank cover and check that the recovery tank is empty; if not, empty it using the drain hose.
4. Close the recovery tank cover, then lift the recovery tank.
5. Unscrew the cap (A) from the detergent bottle (B).
6. Remove the detergent bottle.
7. Rinse and wash out the detergent bottle with clean water in the appointed disposal area.



**Note:** For a thorough washing of the Detergent System, the cleaning procedure can also be performed with the detergent bottle full of water. Turn on the system with the flow set to the maximum. It is advisable to perform this type of cleaning when the Detergent System is dirt/encrusted up, because the machine has not been used/cleaned for a long time.

8. Replace the detergent bottle (B), then refit the plug (A).

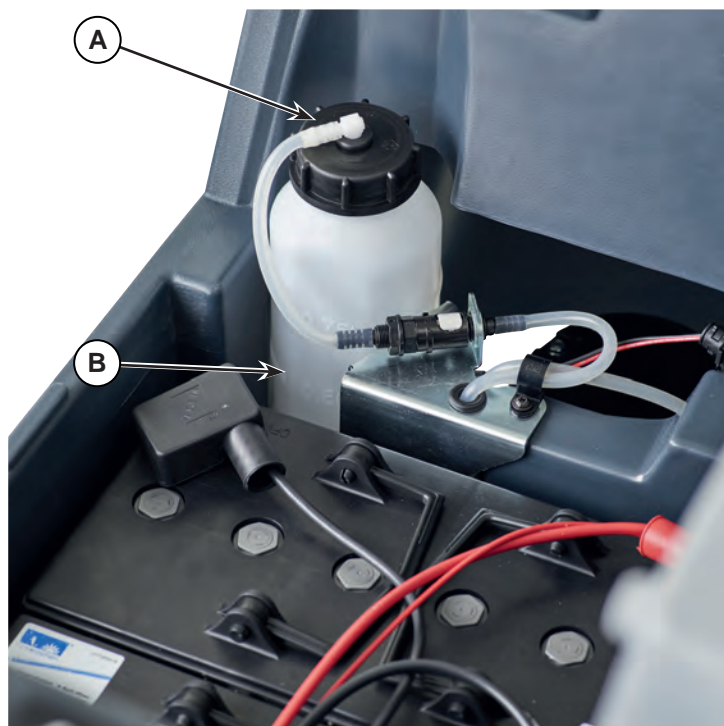


Figure 8:



## Troubleshooting

Trouble	Possible Causes	Remedy
Small amount of solution or no solution reaches the brush	The solution filter is clogged/dirty	Clean the filter
	Solution supply valve locked in (semi) closed position	Replace the valve
	Solenoid valve (EV1) broken or electrical connection interrupted	Replace the solenoid valve/repair the electrical connection
	Presence of debris in water tank blocking the outlet hole	Clean the tank
	Presence of debris in the detergent solution hose, blocking the passage of the liquid	Clean the hoses
The solution reaches the brush also when the machine is off	Presence of dirt or scale in solenoid valve (EV1)	Clean the solenoid valve
	Solenoid valve (EV1) broken	Replace the solenoid valve
The Detergent system is not reaching the brush, or is not arriving in sufficient quantity	The hydraulic circuit upstream of the detergent pump is not triggered	Check if the hose is filled and, if necessary, perform one or more draining cycles
	The pump (M4) is broken or there is an open in the electrical connection	Replace the pump/repair the electrical connection
	There is foreign material/debris in the detergent bottle clogging the output hole	Clean the bottle
	There is debris in the detergent hoses clogging the detergent flow	Clean the hoses

## Removal and Installation

### Solenoid Valve

#### Remove

1. Drive the machine on a level floor or on a hoisting system to facilitate the disassembly procedures.
2. If equipped remove the ignition key, then disconnect the red battery connector.
3. Close the detergent solution tap.
4. Unscrew and disconnect the connection (A) on the solenoid valve (B).
5. Disconnect the detergent supply hose (C) and (D) from the solenoid valve.
6. Unscrew the two screws (E), then remove the solenoid valve (B).

#### Installation

7. Assemble the components in the reverse order of disassembly.

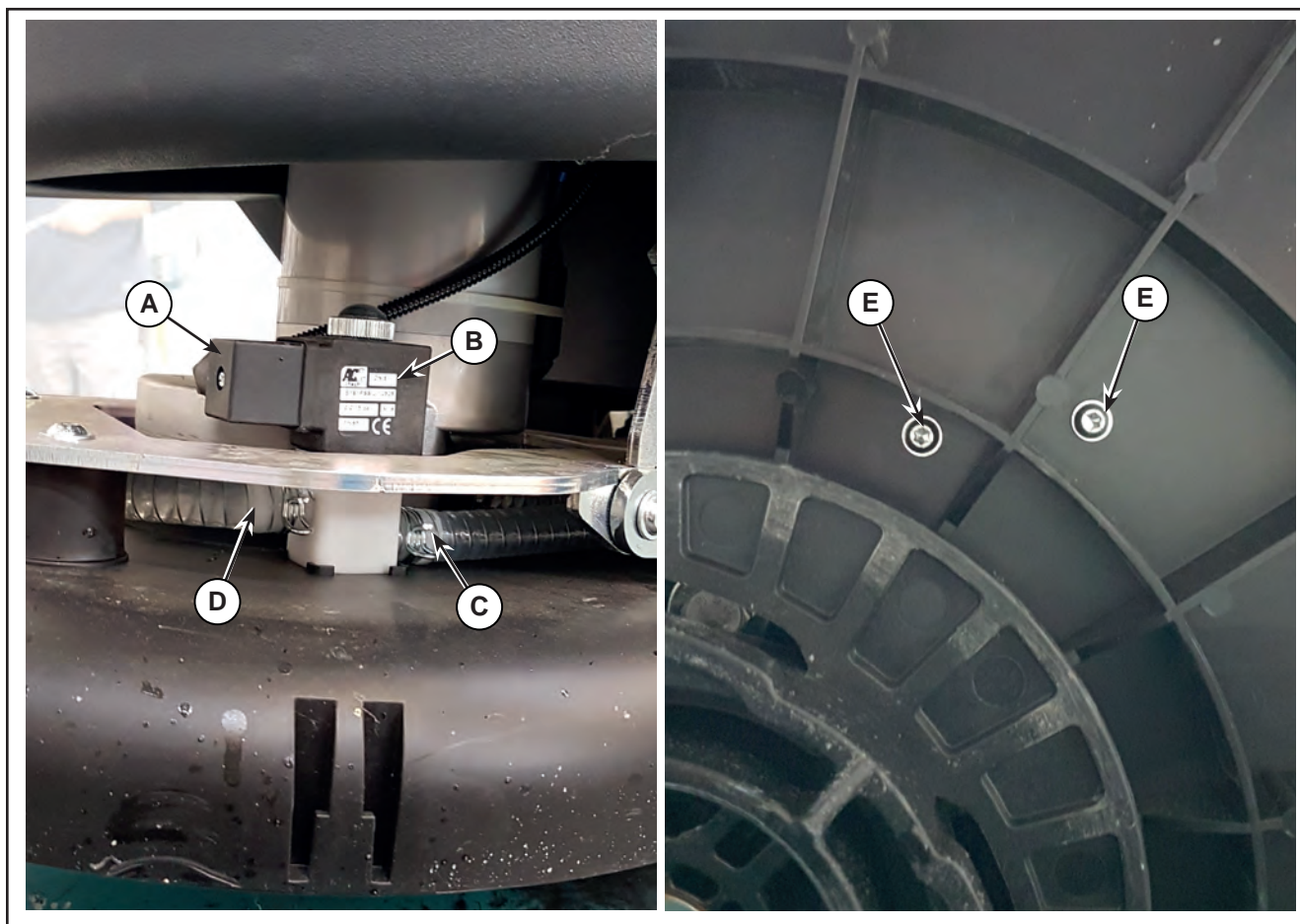


Figure 9:

## Detergent Pump

### Remove

1. Drive the machine on a level floor.
2. If equipped remove the ignition key, then disconnect the red battery connector.
3. Lift the recovery tank.
4. Remove the Detergente bottle.
5. Unscrew the 2 screws (A) and lift the support (B).
6. For remove only the head of the detergent pump:
  - a. Disconnect the tank hose (C) and brush hose (D).
  - b. Remove the head of the detergent pump (E) to the detergent pump motor .
7. For remove the detergent pump:
  - a. Disconnect the connectors (F) tank hose (C) and brush hose (D).
  - b. Unscrew the two screws (G) and remove the detergent pump (H).

### Installation

8. Assemble the components in the opposite order to that they were removed in, ensuring the supply hoses (C) and (D) are correctly fitted on the detergent pump.

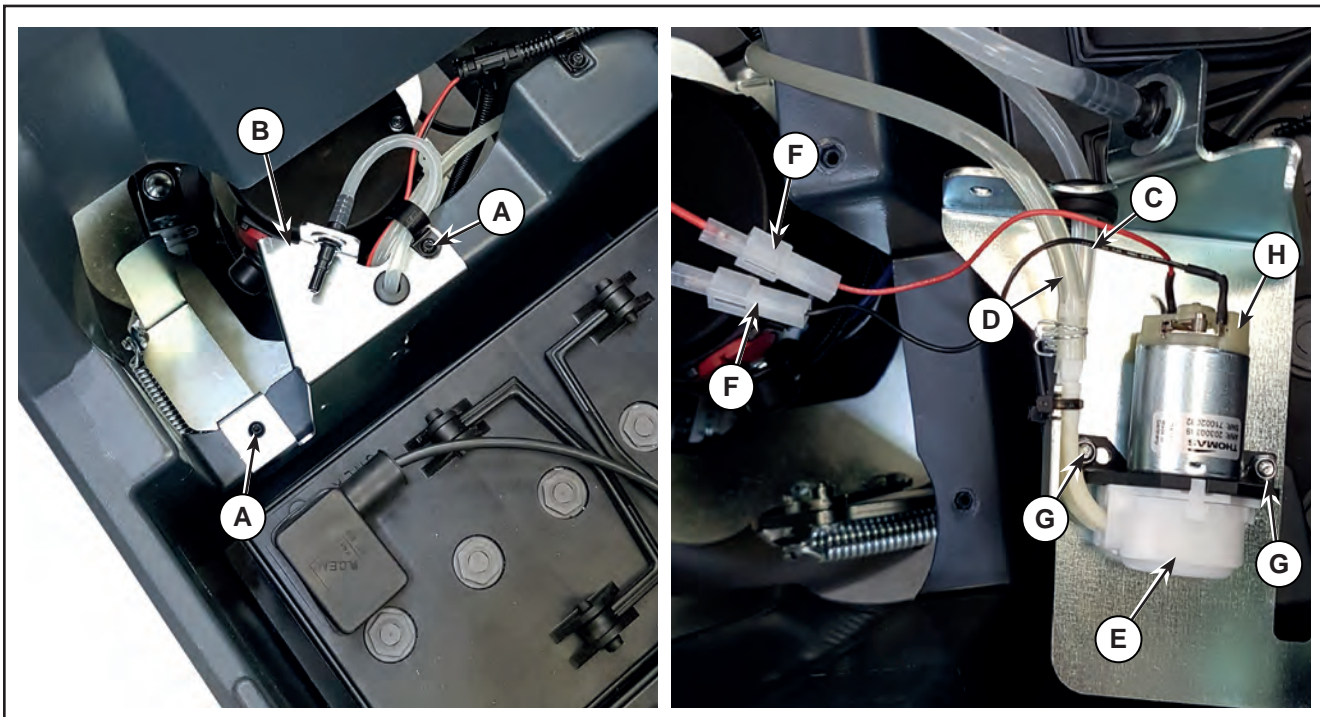


Figure 10:

## Specifications

Description / Model		SC401, SCRUBTEC 344 / BATTERY
Solution tank capacity		12 US gal (45 liters)
Solution flow values		0,08 - 0,18 - 0,53 gpm (0,3 / 0,7 / 2,0 L/m)
Detergent pump technical data	Voltage	24 V
	Current (DC)	90 / 150 mA
	Nominal flow	55 ml/min
	Insulating class	H
Detergent bottle capacity		0,26 US gal (1 liters)
Detergent System detergent percentage		0,25 ÷ 2,0 %

Description / Model		SC401, SCRUBTEC 344 / CORD
Solution tank capacity		12 US gal (45 liters)
Solution flow values		0,08 / 0,18 / 0,53 gpm (0,3 / 0,7 / 2,0 L/m)
Detergent pump technical data	Voltage	230 V
	Protection class	IP65

## 34 - Scrub System, Disc

### Functional Description

The disc brush system can be started by the operator.

The disc brush turn counter-clockwise.

The rotating brush system cleans the surface of the floor. The main component of the brush system is the deck where the brush or the pad holder with pad suitable for the type of surface to be cleaned is installed.

The brush deck is installed on a two lever frame with pedal lifting for connection to the frame integrated with the brush motor is coupled.

The pedal lever lifts and lowers the deck. The operating and washing pressure depends on the weight of the deck.

Brush rotation occurs only when the brush motor (M1) is driven by the Main machine controller (EB1) following activation of the operator's presence sensors (S1, S2).

The brush system uses the solution to wash the floor.

In case of brush motor overload, a safety system stops the brush to prevent continuous overload.

The overload is detected by monitoring the current flow on the brush motor. If the motor current reaches the value stored in the parameter "VS1" and the overload persists, the brush motor will stop following a delay which varies on the basis of the extent of the overload.

To start scrubbing again after a brush stop due to overload, turn the machine off. Then restart the machine by inserting the ignition key.

To work properly, the brush motor (M1) needs the following:

- Brush function on.
- operator's presence sensors on.
- Battery level not in critical condition with flashing segments.


### Brush Engage and Release System

To easily and successfully engage and disengage the brush from the deck hub, there is a Main machine controller control system which adjusts the brush motor speed and stop.

#### Brush Engagement

When the machine is turned on (main button LED


on), if the vacuum button  and the main

button  is pressed simultaneously, the brush motor is powered at the reduced voltage of 8V for 3 seconds in order to facilitate the brush hub engagement.

#### Brush Release

When the machine is turned off (main button LED

off), if the vacuum button  and the main

button  is pressed simultaneously, the brush motor is powered for 3 seconds, then it will be stopped allowing under inertia the brush release from the hub.



## **Brush Motor ANTISPLASHING System**

To prevent the brush from splashing water outside the work path, in case of particularly smooth floors, the machine is equipped with an automatic brush motor system to reduce the power voltage in case of reduced absorption. This system prevents the brush from reaching an excessive rotation speed, and additionally reduced energy consumption of smooth floors.

The system operates as follows: if the brush motor current absorption is lower than the parameter “Reduced brush consumption” (default: 9 Amp), the motor is powered at a voltage equal to the parameter “Brush reduced voltage” (default: 20V) instead of the battery voltage. The transition time of the voltage value applied is equal to the parameter “Brush voltage transition time” (default: 3 sec.).

## Wiring Diagram

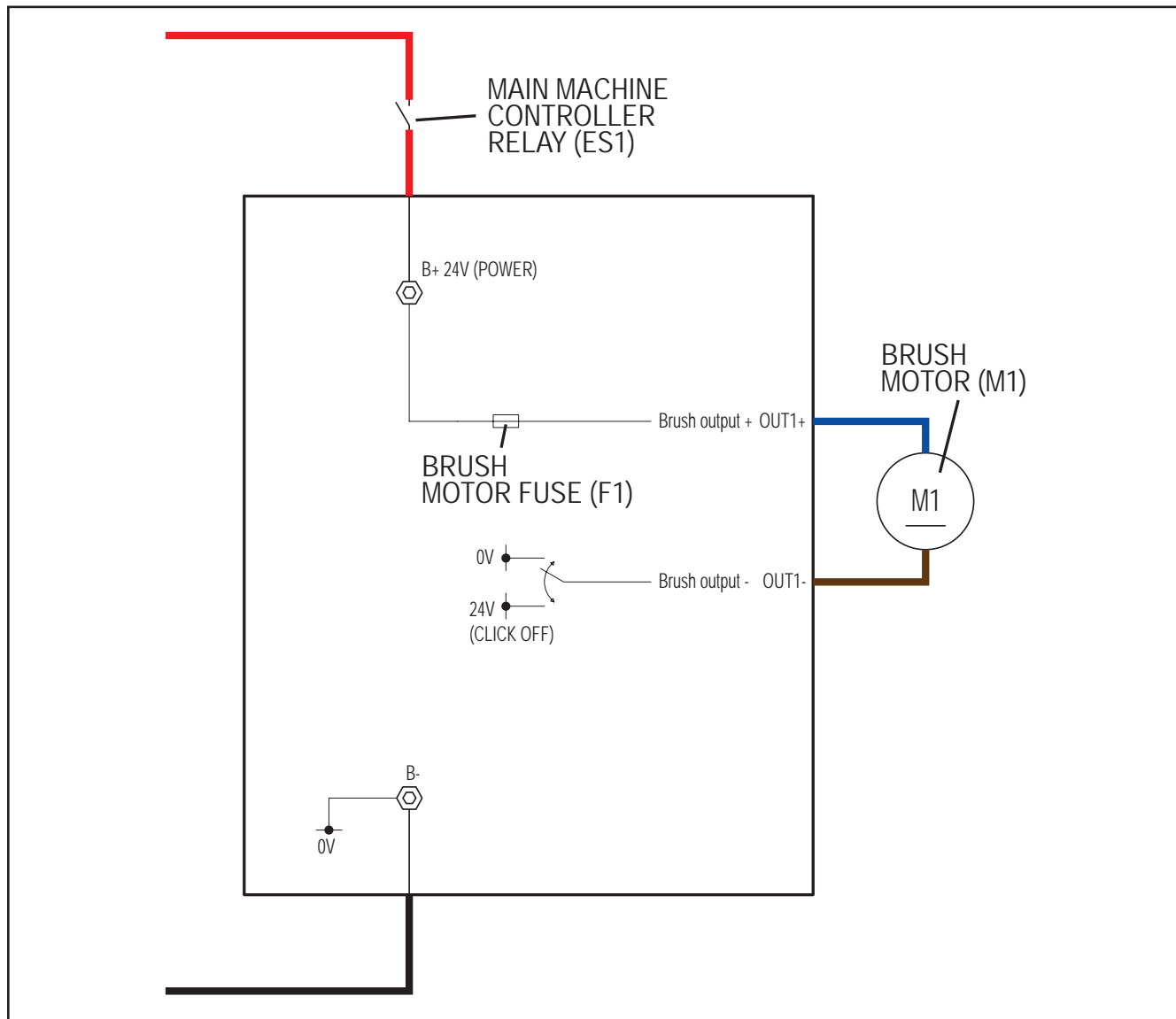


Figure 1:

## Component Locations

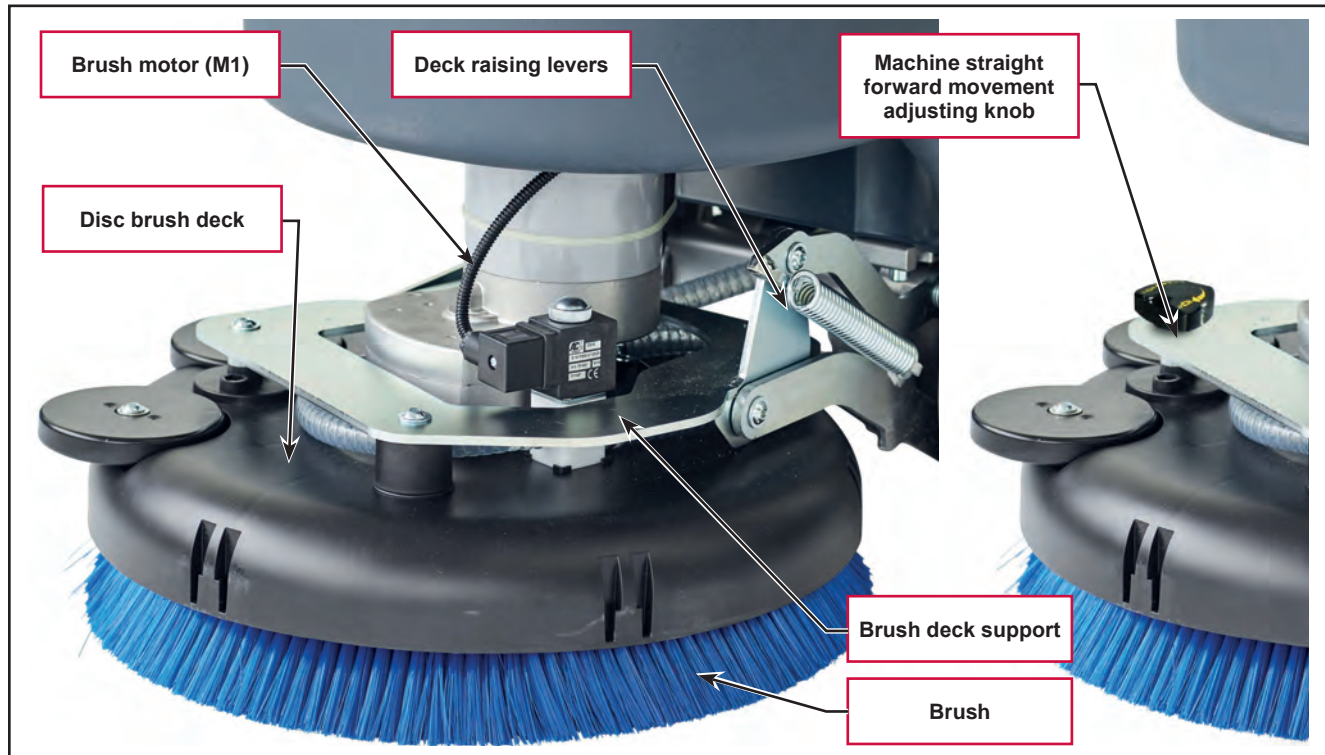


Figure 2:

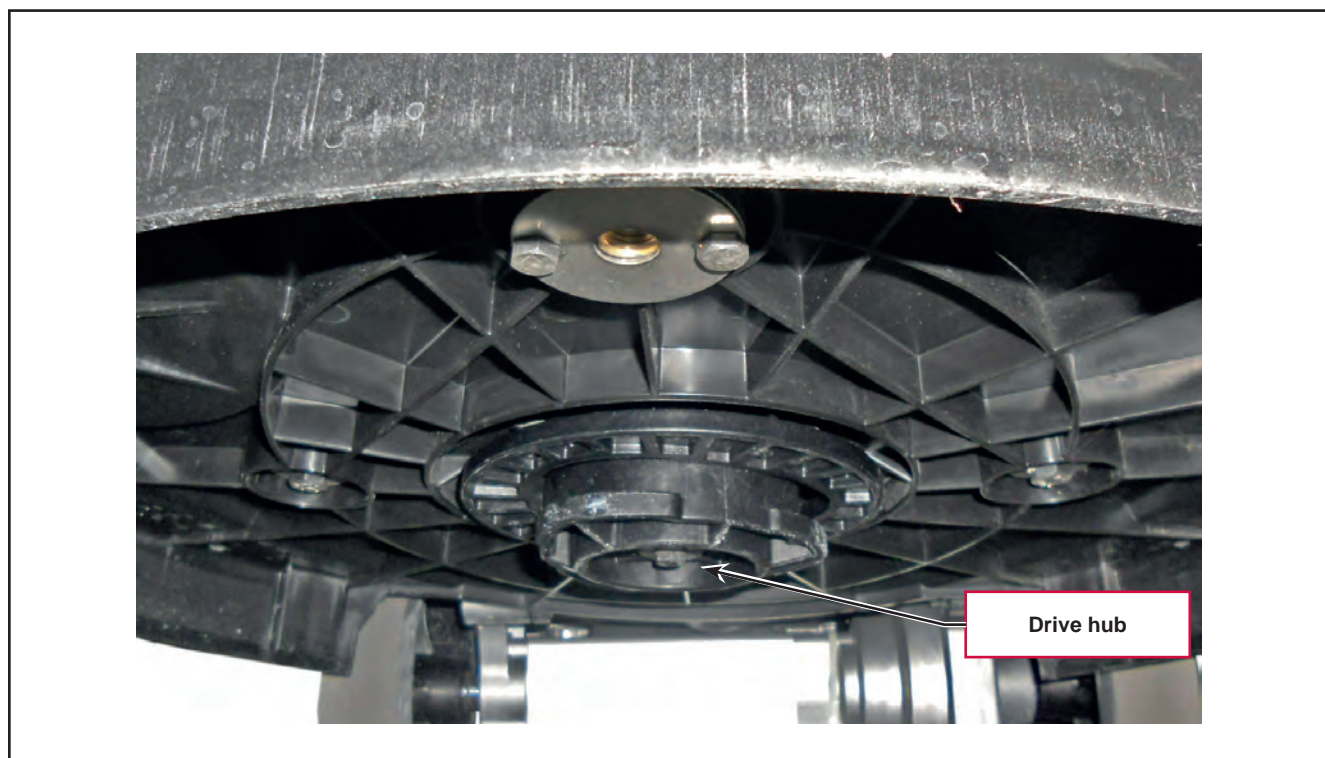


Figure 3:

## Maintenance and Adjustments

### Brush or Pad-Holder

#### Installation

According to the kind of cleaning to be performed, the machine can be equipped either with the brush (A) or the pad-holder (B) with pad (C) together with the appropriate deck.



1. Place the brush (A) or the pad-holder (B) under the brush deck.

2. (If equipped) Turn the ignition key to "I".

3. Press the main button  to start the machine.



4. Press the main button  (LED on) again.

5. Lower the brush deck by pressing the pedal.


6. To activate the brush engagement function, press the vacuum button  and the main button  simultaneously for one second.

#### Removal

7. Press the main button  (LED off).
8. Lift the brush deck by pressing the pedal.

9. To activate the brush disengagement function, press the vacuum button  and the main button  simultaneously for one second, then wait for the brush to fall on the floor.



**Note:** When the brush engagement / disengagement function is activated, main button  LED flashes.

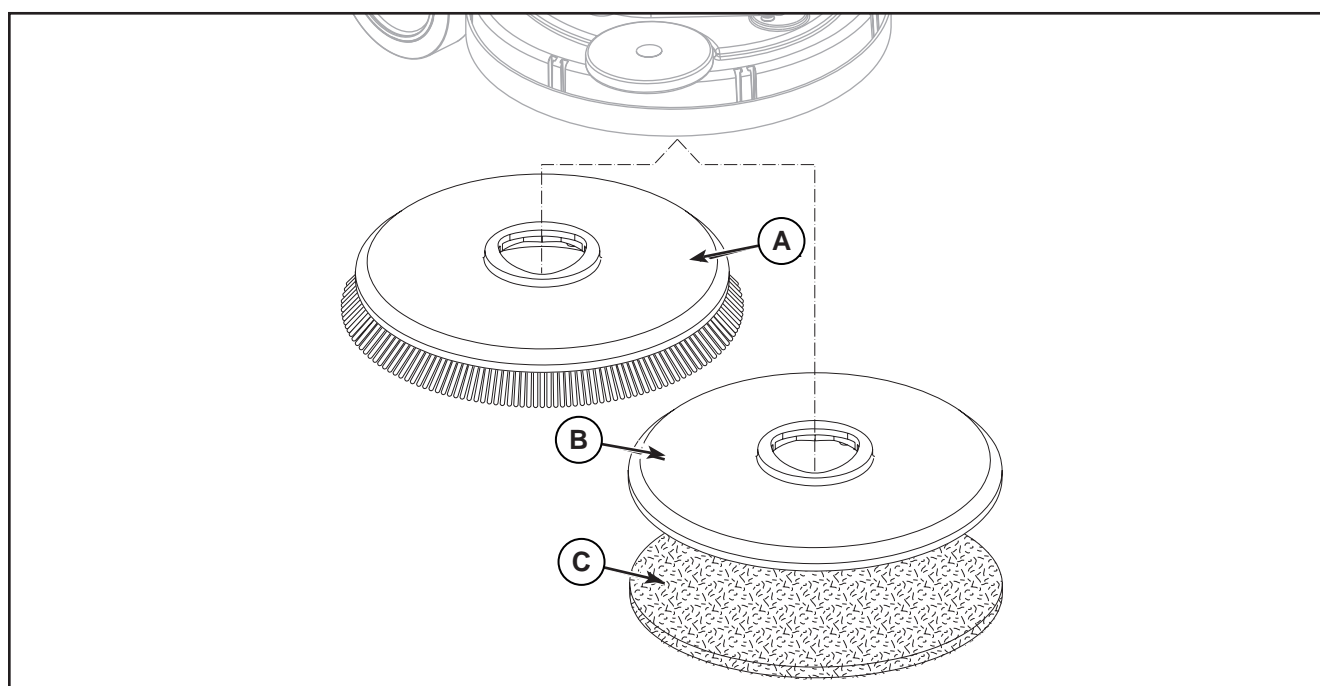


Figure 4:

## Brush Motor Cleaning

1. Drive the machine on a level floor or on a hoisting system to facilitate the procedures.
2. If equipped remove the ignition key, then disconnect the red battery connector.
3. Under the machine, check and clean the brush motor (A) by using compressed air nozzle (B) from the dirt/dust that could compromise its correct function (overheating, overvoltage ect.).



Figure 5:



## Troubleshooting

Trouble	Possible Causes	Remedy
The brush does not clean properly	The brush is excessively worn	Replace
The brush does not turn		See the Control System chapter, " <a href="#">General system alarms</a> " paragraph
	Brush motor carbon brushes worn	Replace
	Presence of bulky debris or string around the brush or between the brush and attachment flange	Remove the brush and clean it
	Faulty brush motor	Repair or replace
	Wiring damaged	Repair
The brush disengagement system does not work	Main machine controller (EB1) faulty	Replace
	User interface controller (EB2) faulty	Replace

## Brush Motor Current Draw Test



**WARNING:** This procedure must be performed by qualified personnel only.


1. Drive the machine on a level floor.
2. Remove the brush.
3. Lift down the brush deck with the lever.
4. (If equipped) Turn the ignition key to “I”.
5. Press the Main button  to start the machine.
6. Switch off the vacuum system (A, Led off), the detergent system (B, Led off ) and (if present) the Speed adjuster (C) rotated to the left end.
7. Apply the amperometric clamp (D) to an electrical cable (E) of the brush motor.
8. Activate the brush by the presence sensors (F), then check that the brush motor current draw is between 1 and 2A at 20V(\*).
9. Deactivate the brush by releasing the presence sensors and raise the brush deck.
10. Remove the Amp clamp (D).
11. If the amperage is higher or unexpeted, perform the following procedures to detect and correct the abnormal amperage:
  - Check the brush motor carbon brushes.
  - Remove the brush motor then check the condition of its components.
12. If the above-mentioned procedures do not lead to a correct amperage, it is necessary to replace the brush motor.



Figure 6:

- (\*) Voltage value supplied by the Main machine controller to the brush gear motor when the gear motor current draw is less than the value of the RPM parameter.

## Removal and Installation

### Brush Deck

#### Removal

1. Drive the machine on a level floor or on a hoisting system to facilitate the disassembly procedures.
2. Remove the brush.
3. Switch off the machine and disconnect the battery connector.
4. Lower the brush deck by pressing the pedal
5. Under the machine, disconnect the detergent supply hose (A) from the detergent filter (B).
6. Unscrew and disconnect the connection (C) on the solenoid valve (D).
7. Remove the screws (E), (F) and (G) of the levers, then retain its bushings.

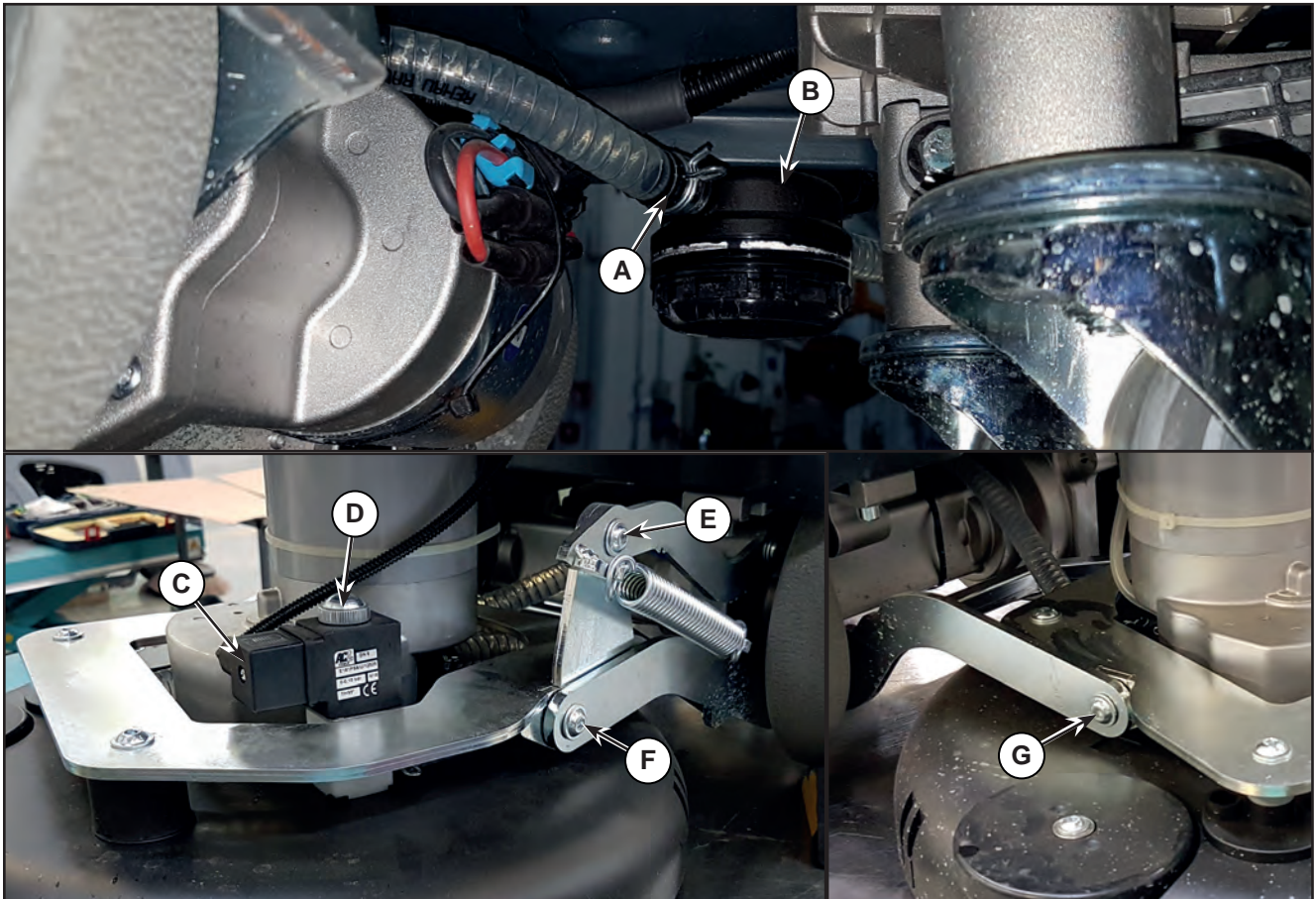


Figure 7:



### Brush Deck (continues)

8. Pay attention to disconnect the detergent hose (H) (see “[detergent pump](#)” paragraph).
9. Remove the tie cable to release the motor harness.
10. Unscrew the 2 retaining nuts (I), (J) and disconnect the brush motor power supply cables.
11. Extract the brush deck (K) from beneath the solution tank.

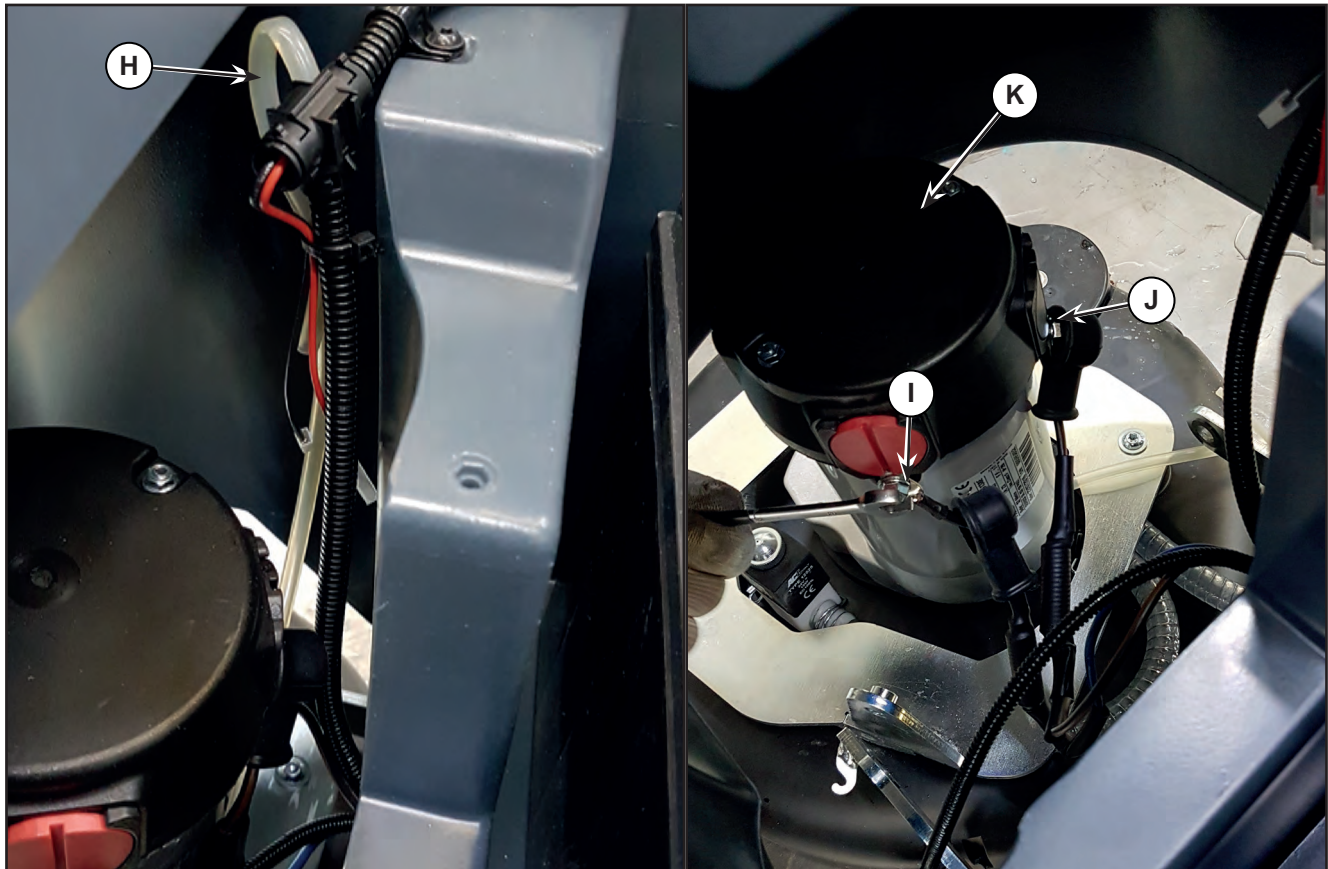


Figure 8:

### Installation

12. Assemble the components in the opposite order they were removed in, ensuring the brush motor power supply cable polarities are correct.

## Brush Motor Carbon Brushes Checking/Replacing

### Check

1. Remove the brush deck.
2. Remove any dust and dirt from around the brush motor carbon brushes.
3. Remove the four protective covers (A) (Figure 11) by disconnecting the clips.
4. Remove the carbon brush nuts (B) with the lead-in wires.
5. Disengage the tabs (C) and remove the carbon brushes (D).
6. Check the carbon brushes (D) for wear. The carbon brushes are worn out when:
  - They do not make sufficient contact with the armature of the brush motor due to their wear
  - When their contact surface is not intact
  - When the residual stroke is below 0.12 in (3 mm)
  - When the thrust spring etc. is broken
7. Replace the carbon brushes as an assembly.

### Replacing

8. Assemble the components in the reverse order of disassembly.

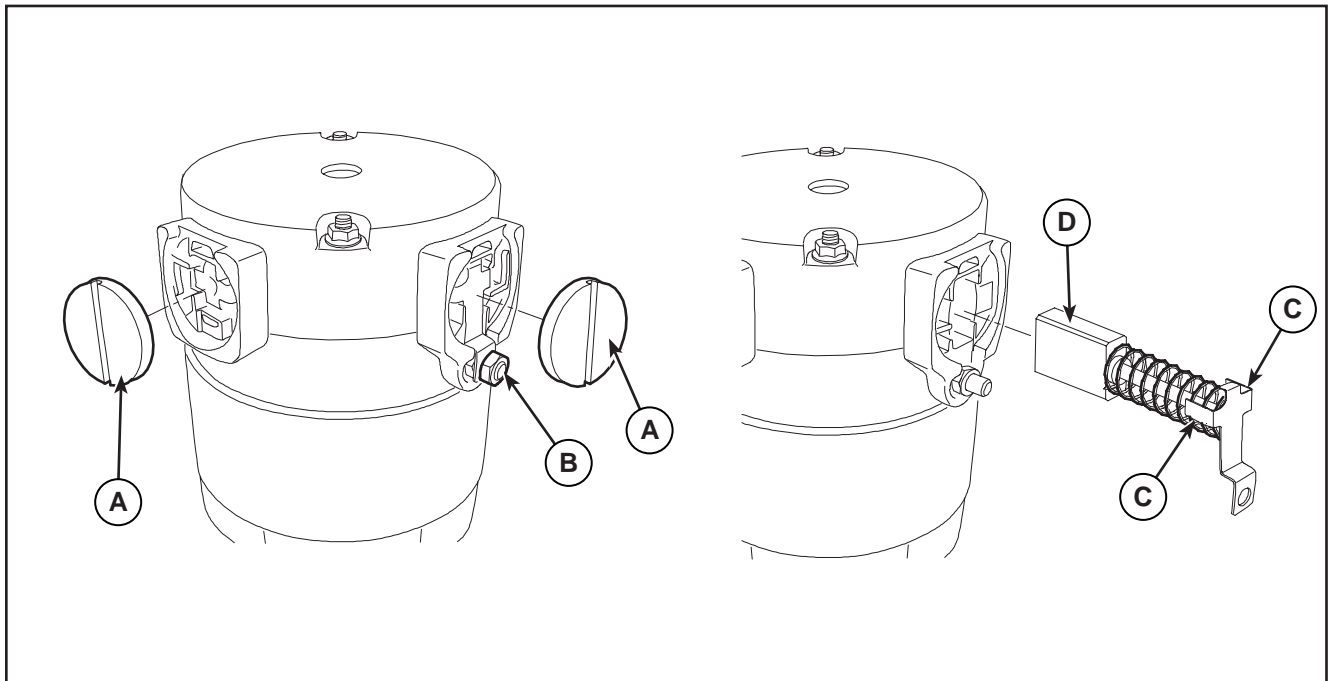


Figure 9:



## Brush Motor Disassembly/Assembly

### Disassembly

1. Remove the brush deck.
2. Working at the bench, remove the screw (A) and recover its washers.
3. Use two little crowbar (B) for remove the brush hub (C) to the brush motor pin.
4. Recover the key (D).
5. Remove the screws (E).
6. Remove the brush motor (F).

### Assembly

7. Assemble the components in the reverse order of disassembly.



**Note:** Use the rubber hammer for mounting the brush hub (C).



**Note:** For further information on deck components see the Spare Parts List.

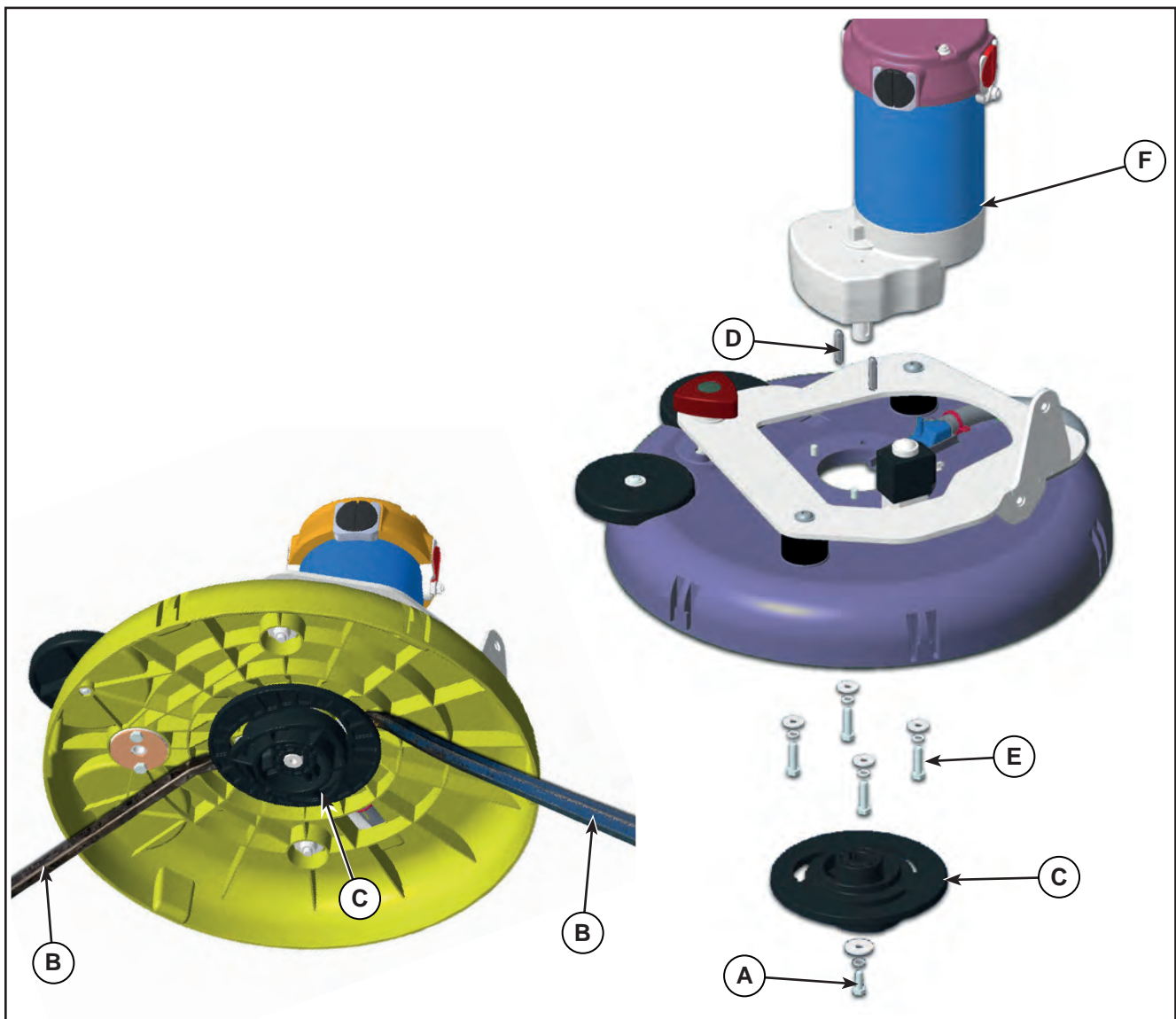


Figure 10:

## Starting Capacitor Replacing (Cord Model)

### Removal

1. Ensure that the machine is turned off and the power supply cable plug is disconnected from the electrical mains.
2. Lower the brush deck by pressing the pedal
3. Unscrew the 4 screws (A) and remove the cover (B).
4. Unscrew the screw (C) for disengage the brown wire (D).
5. Unscrew the screw (E) for disengage the blue wire (F).
6. Lift the harness (G) to the box.
7. Unscrew the screw (H) and remove the Electronic capacitor (I).

### Replacing

8. Assemble the components in the reverse order of disassembly.

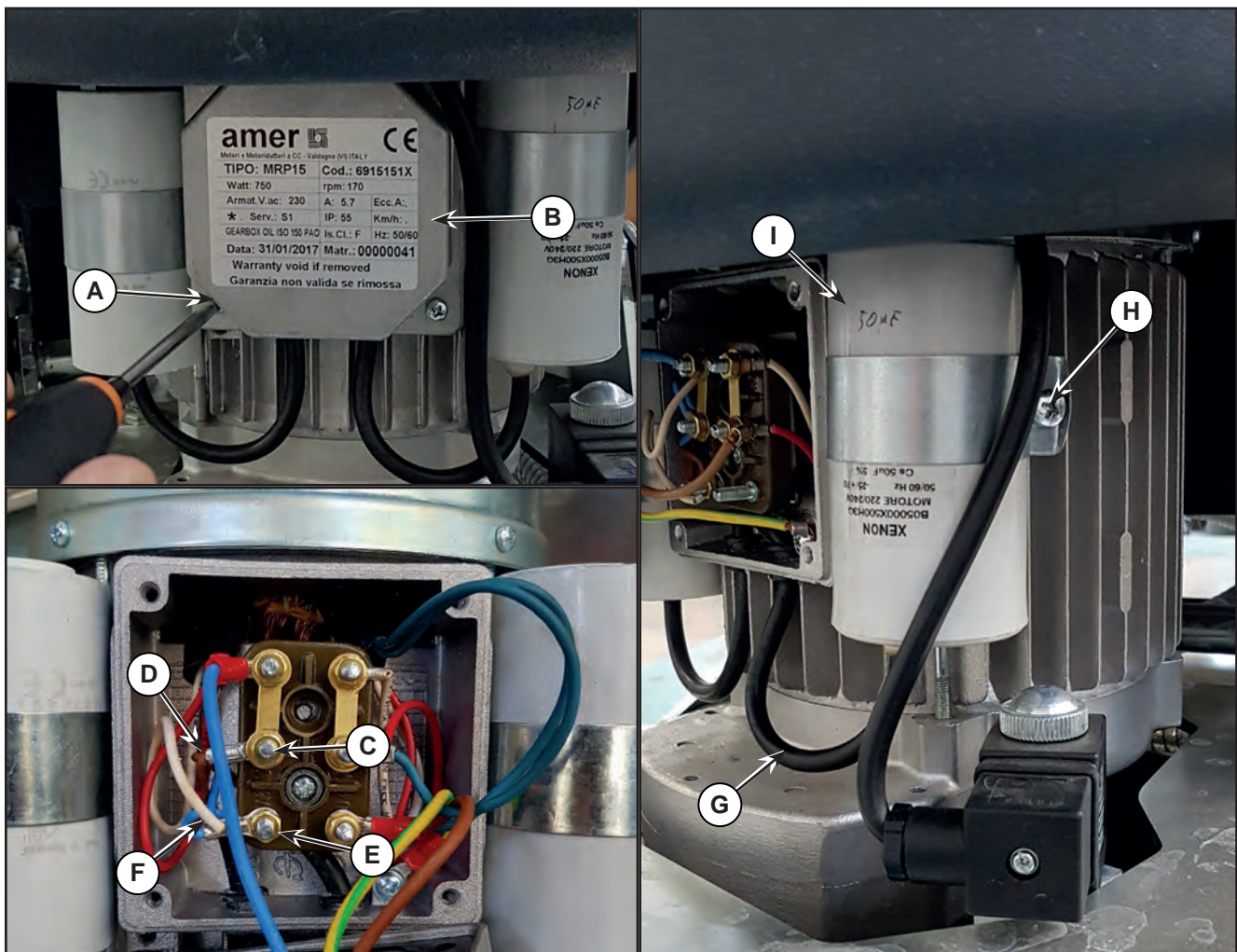


Figure 11:



## Capacitor Run Replacing (Cord Model)

### Removal

1. Ensure that the machine is turned off and the power supply cable plug is disconnected from the electrical mains.
2. Lower the brush deck by pressing the pedal
3. Unscrew the 4 screws (A) and remove the cover (B).
4. Unscrew the screw (C) for disengage the brown wire (D).
5. Unscrew the screw (E) for disengage the blue wire (F).
6. Lift the harness (G) to the box.
7. Unscrew the screw (H) and remove the Electronic capacitor (I).

### Replacing

8. Assemble the components in the reverse order of disassembly.

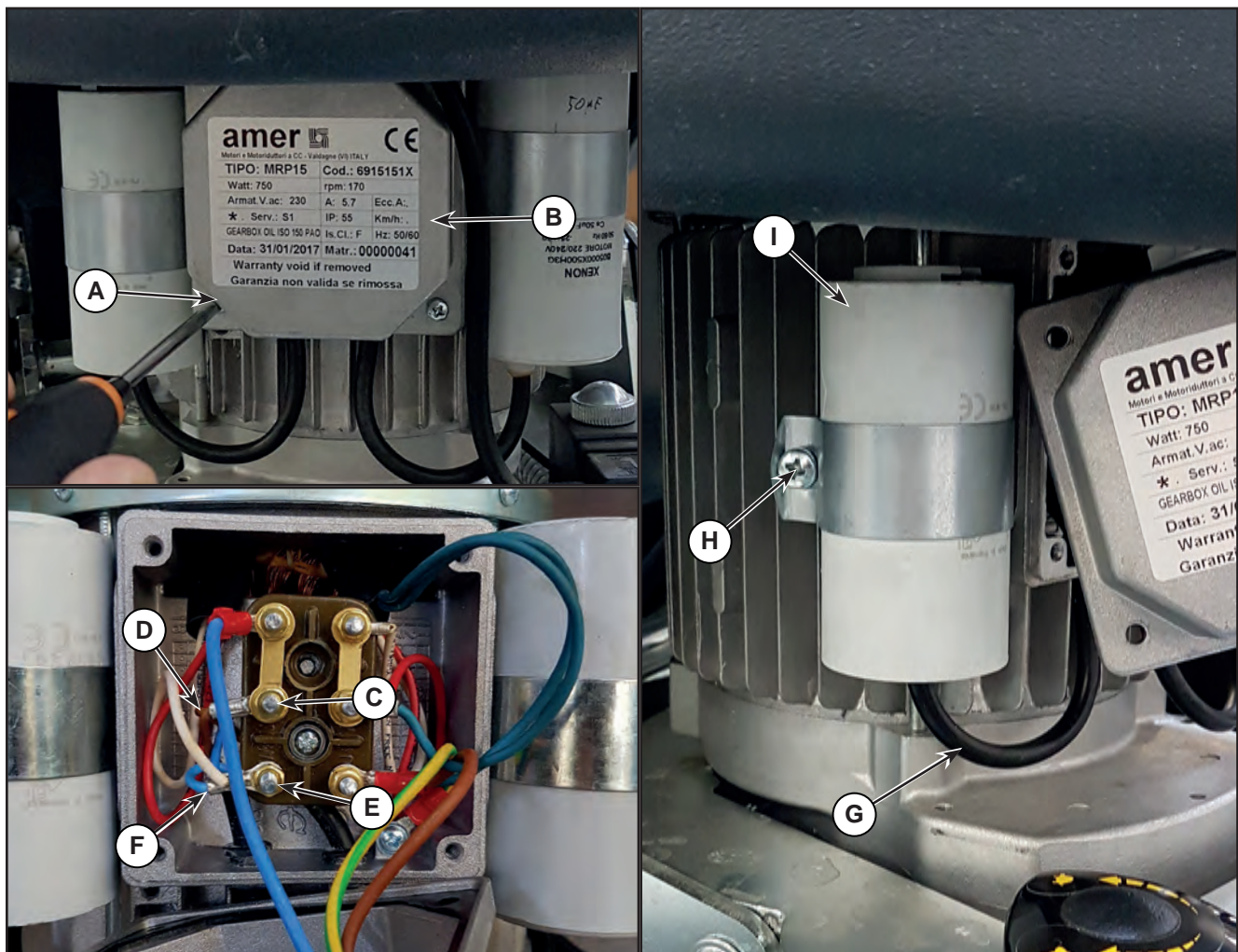


Figure 12:

## Specifications

Description / Model	SC401, SCRUBTEC 344 / BATTERY
Cleaning width	17 in (430 mm)
Brush/pad diameter	17 in (430 mm)
Brush pressure	55 lb (25 kg)
Brush deck right/left offset	65 / 15 mm (2.5 / 0.6 in)
Brush distance from the floor (when lifted)	1.6 in (40 mm)
Brush motor power	0,6 hp (450 W)
Brush rotation speed	140 rpm
Protection class	IP 20
Insulation class	F

Description / Model	SC401, SCRUBTEC 344 / CORD
Cleaning width	17 in (430 mm)
Brush/pad diameter	17 in (430 mm)
Brush pressure	66 lb (30 kg)
Brush deck right/left offset	65 / 15 mm (2.5 / 0.6 in)
Brush distance from the floor (when lifted)	1.6 in (40 mm)
Brush motor power	1 hp (750 W)
Brush rotation speed	170 rpm
Protection class	IP 55
Insulation class	F

## 38 - Squeegee System

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### **Functional Description**

The squeegee system cleans the liquid off the floor, which is then collected by the recovery system.

The squeegee is mounted on castors and the weight of the system presses it down on the floor.

The squeegee is attached with two quick-fastening handwheels which fit in the slots of the squeegee support. In case of fixed obstacles, the quick-fit system allows for squeegee immediate removal.

The squeegee can be raised and lowered by the operator using just their foot on the squeegee support footrest thanks to a mechanism consisting of two levers and a spring.

The angle of the squeegee and the correct adherence of the blades on the floor can be adjusted with a knob.

The front blade has an opening in the bottom edge so the squeegee can collect the water on the floor. The design and the central duct make it easy for the squeegee to clear the water. The bottom edge of the blade is smooth.

All 4 functional edges of each blade can be used before it needs replacing.



## Component Locations

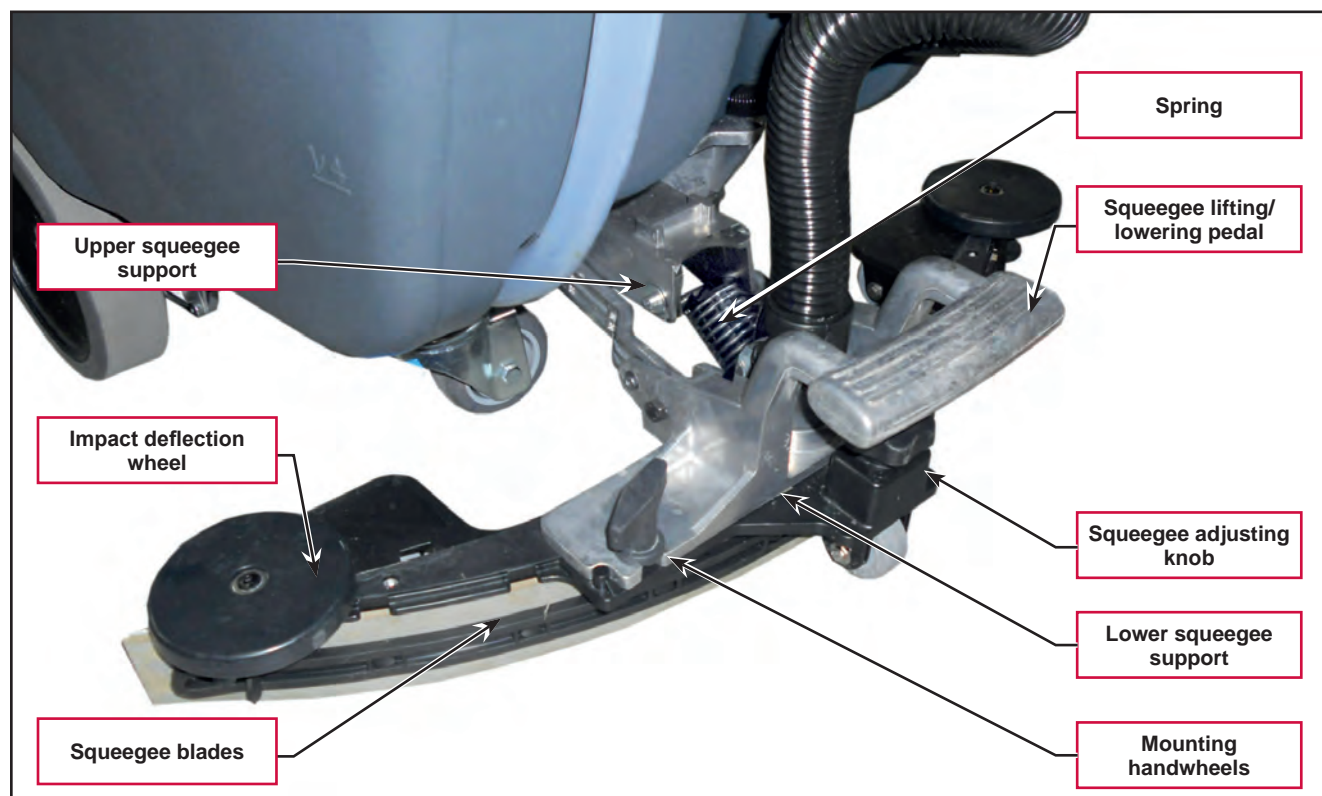


Figure 1:

## Maintenance and Adjustments

### Squeegee Cleaning



**Note:** The squeegee must be clean and its blades must be in good conditions in order to get a good drying.



**WARNING:** It is advisable to wear protective gloves when cleaning the squeegee because there may be sharp debris.

1. Drive the machine on a level floor.
2. Ensure that the machine is off and the ignition key has been removed.
3. Loosen the handwheels and remove the squeegee.
4. Wash and clean the squeegee. In particular, clean the compartments (A) (Figure 2) and the vacuum hole (B). Check that the front blade (C) and the rear blade (D) are integral and free from cuts and lacerations; if necessary replace them.
5. Assemble in the reverse order of disassembly.

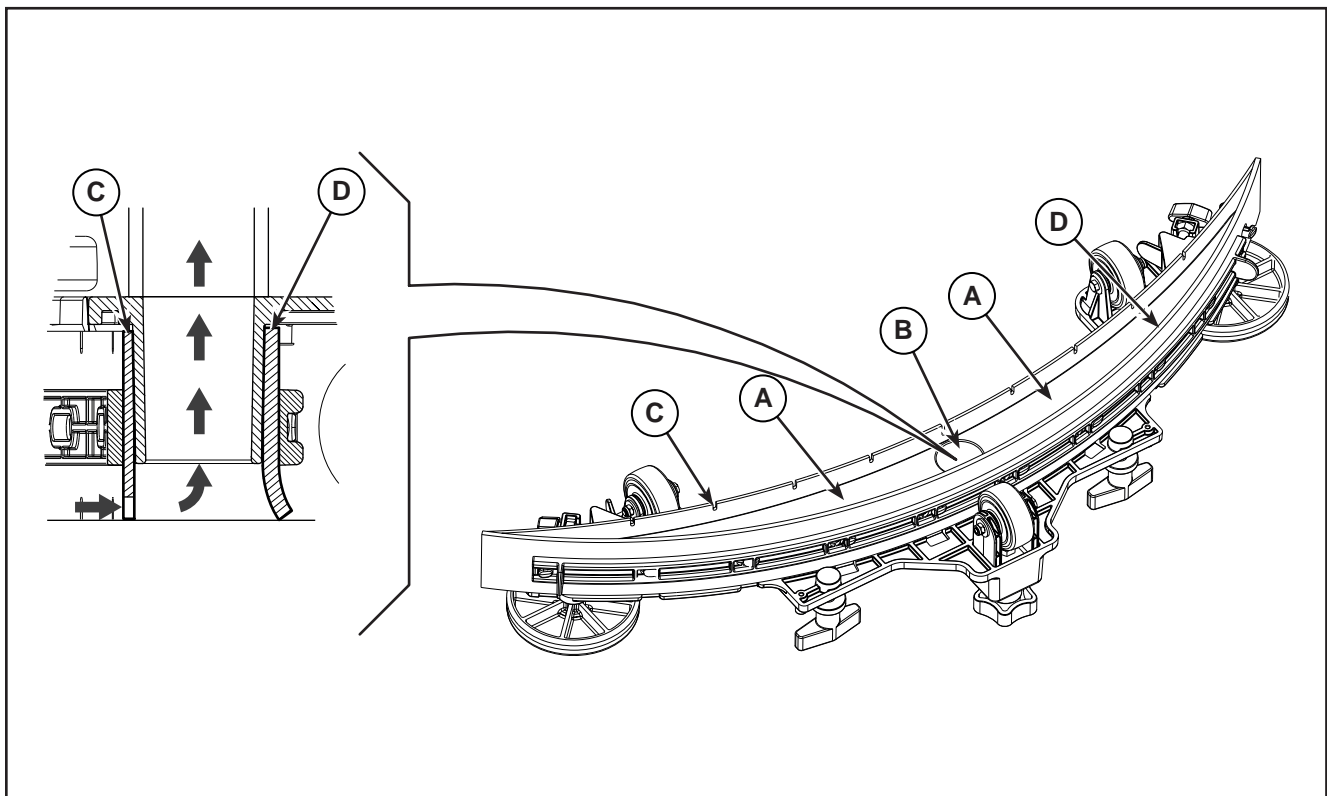


Figure 2:

## Checking/Replacing the Squeegee Blades



**Note:** The squeegee must be clean and its blades must be in good conditions in order to get a good drying.



**WARNING:** It is advisable to wear protective gloves when cleaning the squeegee because there may be sharp debris.

1. Clean the squeegee as shown in the previous paragraph.
2. Check the condition of the front (C) (Figure 3) and rear (D) blades, ensuring there are no cuts and tears; if necessary, replace them as shown below. Check that the front corner (E) of the rear blade is not worn; otherwise, turn the blade to replace the worn corner with one of the three remaining intact corners. If the other corners are worn too, replace the blade according to the following procedure:
  - Using the tab (F), release and remove the elastic strap (G) from the fasteners (H), then turn or replace the rear blade (D).
  - Install the blade in the reverse order of removal. Fix the elastic strap (G) to the fasteners (H) starting from one side. Constrain to the fastener one by one, with the hand (M) blocking the elastic strap before the fastener and pulling with the other hand (N) for fixing
  - Unscrew the handwheels (I) and remove the strap (J), then turn or replace the front blade (C).
  - Install the blade in the reverse order of removal.
3. Install the squeegee on the support and screw down the handwheels.
4. Lower the squeegee to the floor to check the height of the blades, proceeding as follows:
  - Check that the lip (K) of the front blade (C) and the lip (L) of the rear blade (D) are resting as shown in the figure.
  - Use the knob to make adjustments.

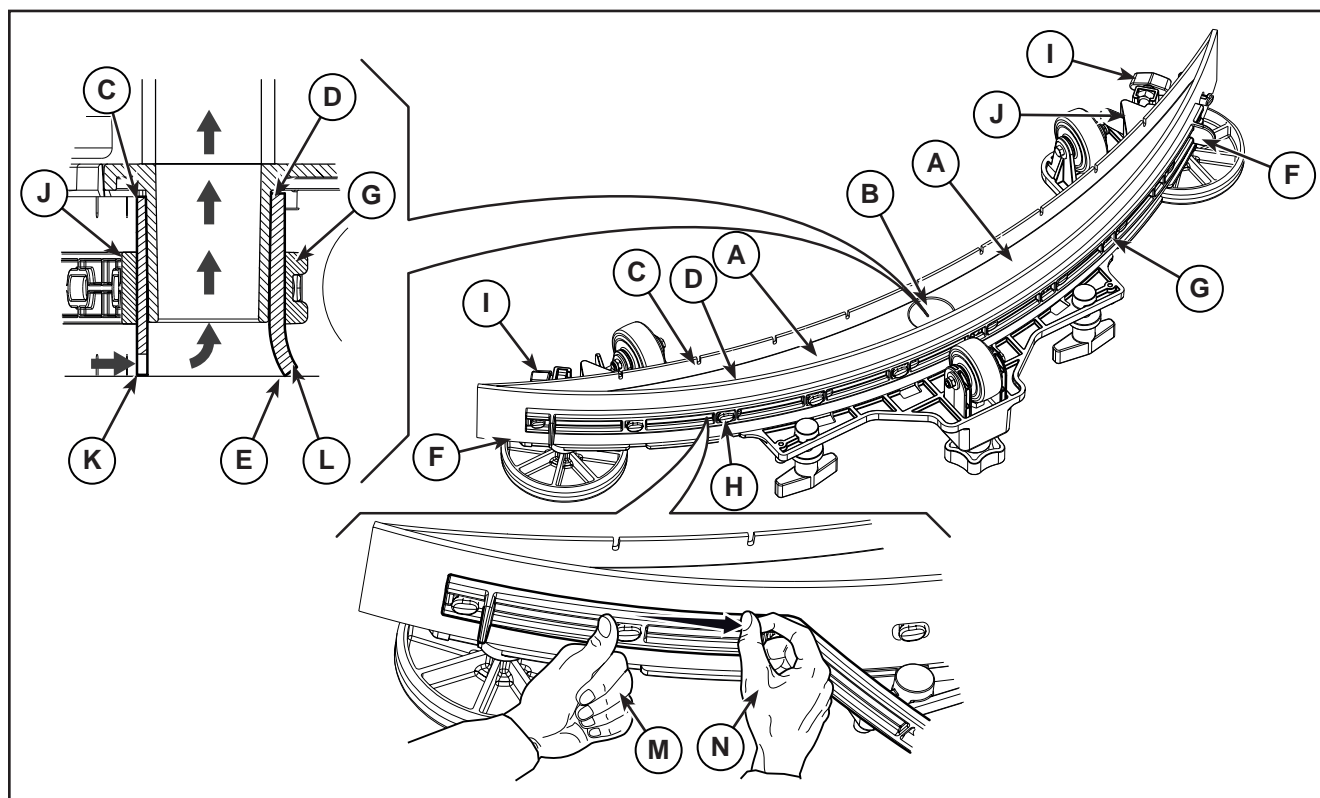


Figure 3:

## Troubleshooting

Trouble	Possible Causes	Remedy
Suction of dirty water is insufficient or non-existent	Squeegee or vacuum hose blocked or damaged	Clean or repair/replace
The squeegee leaves lining on the floor or does not collect water	There is debris under the blade	Remove
	Squeegee blade lips damaged or worn	Replace
	Squeegee not balanced	Adjust with the relevant handwheel
Squeegee will not raise	Spring off seat.	Replace.

## Removal and Installation

### Spring on the Squeegee Support

#### Removal

1. Drive the machine on a level floor or on a hoisting system to facilitate the disassembly procedures.
2. Remove the squeegee from the squeegee support (A), then lower the squeegee support by slowly to the floor.
3. Press lightly the spring (B) then remove it with its pair of spring plastic retainers.

#### Installation

4. Assemble the components in the reverse order of disassembly and note the following:
  - Mount the spring with its pair of spring plastic terminals as shown of the picture (C).

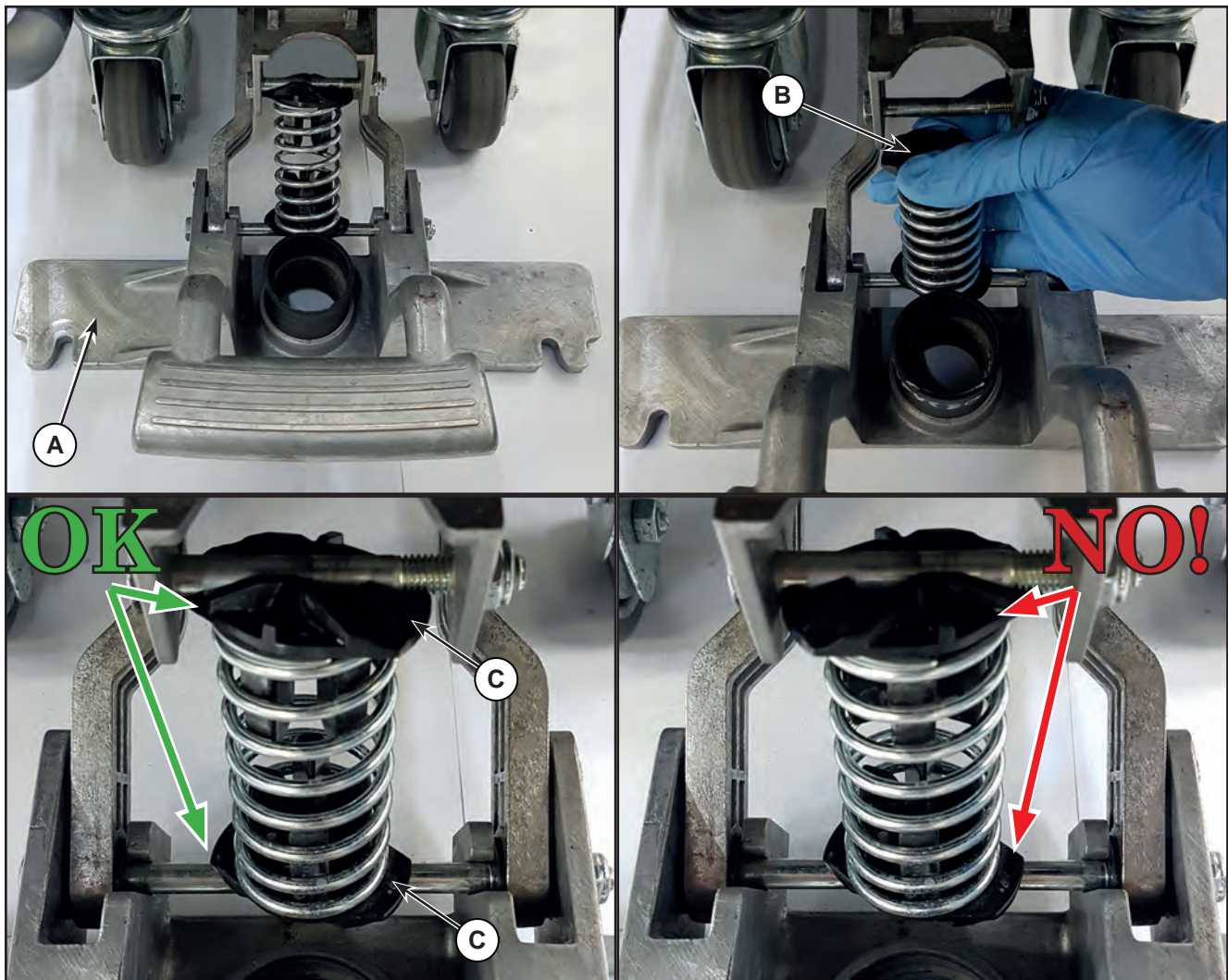


Figure 4:



## Specifications

Description / Model	SC401, SCRUBTEC 344
Squeegee width	28.3 in (720 mm)

## 40 - Recovery System

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### Functional Description


The recovery system removes the dirty water from the floor and pipes it to a recovery tank. When the machine is running, the dirty water on the floor is collected by the squeegee blades and collected through the slots in the same, piped through the vacuum hose and into the tank by the airflow created by vacuum motor (M2). The dirty water is piped into the recovery tank, while the airflow continues to the vacuum fan.


A tank with a grid collects the largest debris going through the recovery tank hose.

The automatic float in the vacuum grid stops vacuum system motor (M2) from collecting any liquids.

When the automatic float closes and shuts down the vacuum system, the vacuum system motor noise will increase and the floor will not be dried.

The vacuum system is activated automatically with the Main button . It can then be managed

independently via the Vacuum system button . The vacuum system is activated in full power or silent mode depending on the last mode in use before the machine was switched off. This mode can be changed by

repeatedly pressing the Vacuum system button . The various vacuum modes are also displayed on the multifunction display.

When the recovery tank is full it can be emptied through the drain hose.

## Wiring Diagram

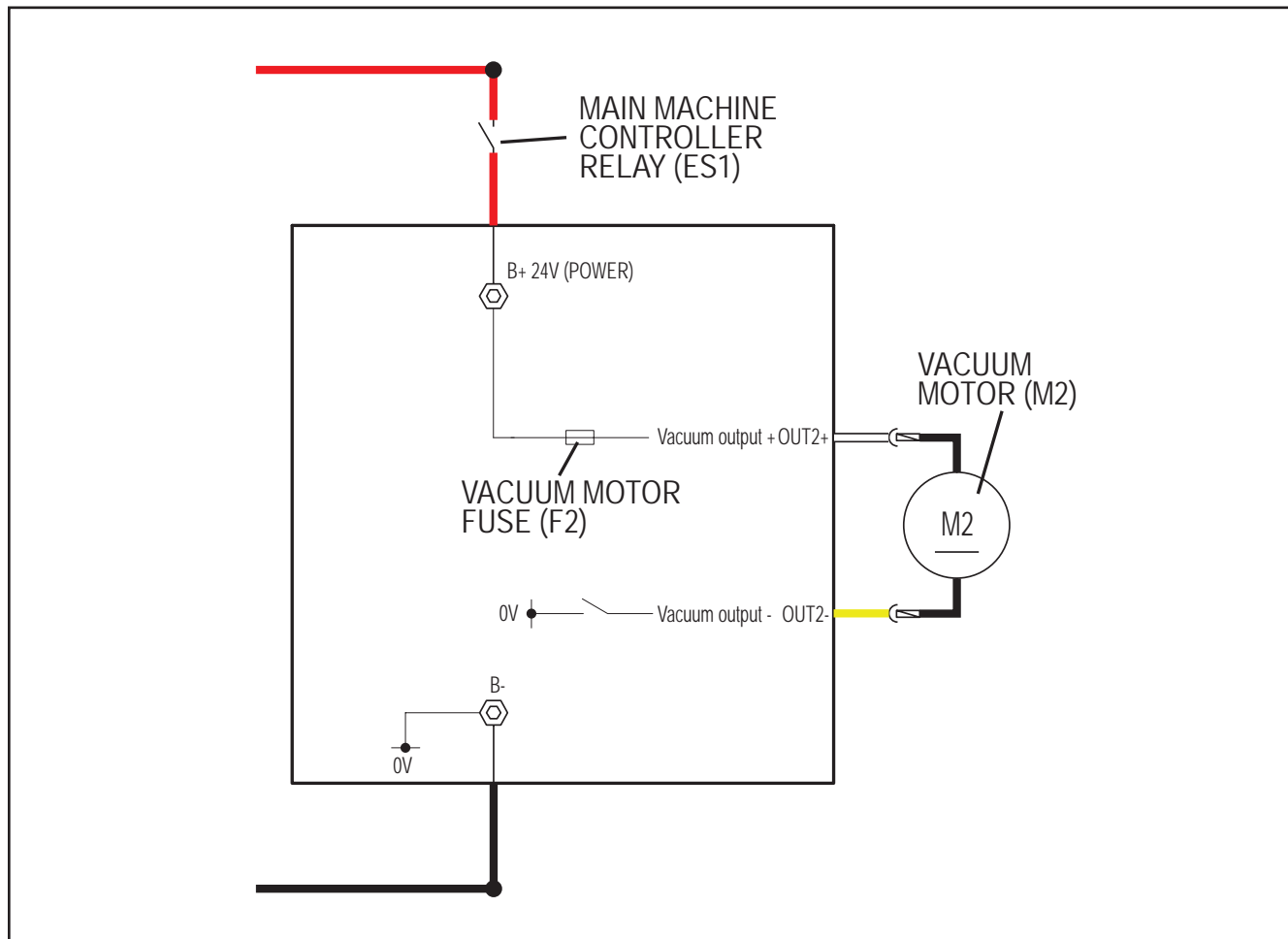


Figure 1:

## Component Locations



Figure 2:

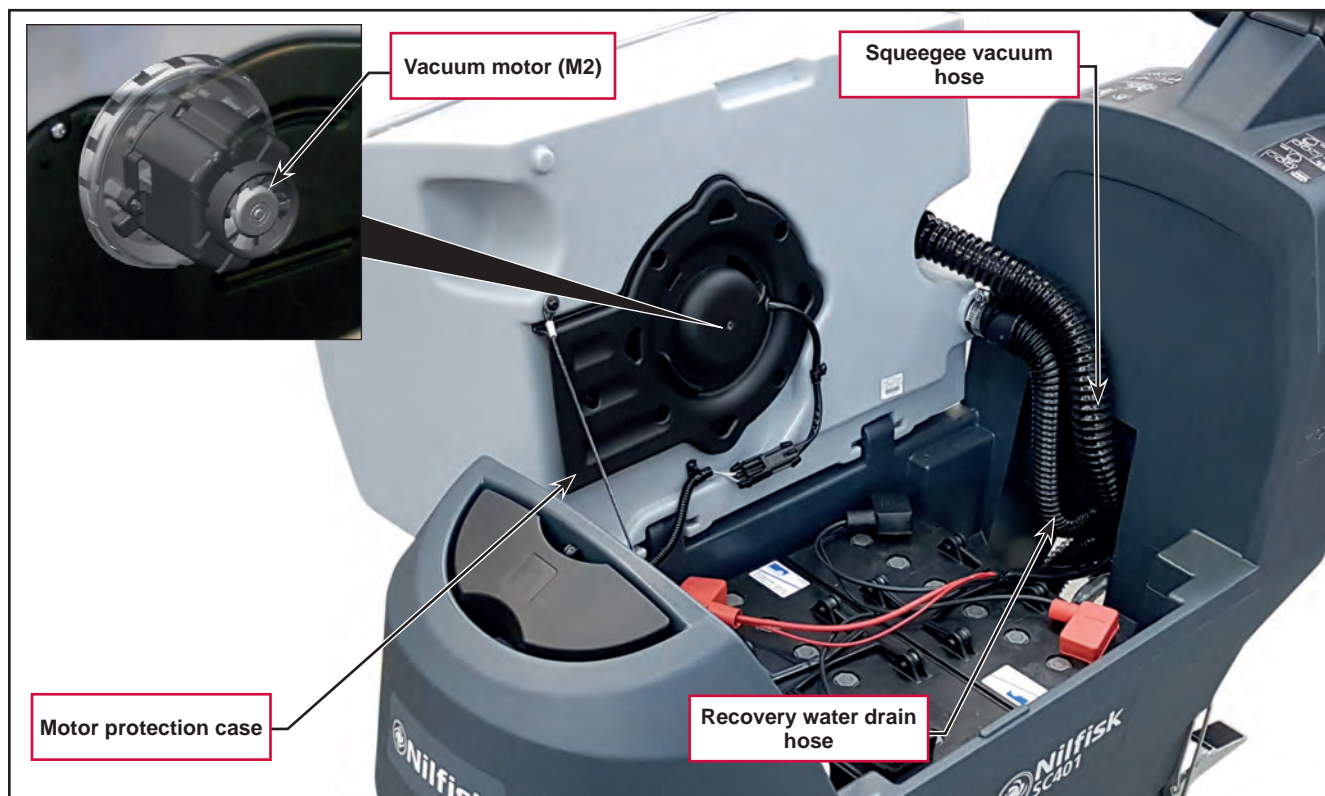


Figure 3:

## Maintenance and Adjustments

### Recovery Tank Cleaning

1. Drive the machine to the appointed disposal area.
2. Ensure that the machine is off and the ignition key has been removed (if equipped).
3. Drain the water in the tank through the hose.
4. Raise the recovery tank cover.
5. Wash the inside of the recovery tank and the cover with clean water.
6. Clean the vacuum grid (B), release the fasteners (A), open the grid (B) and recover the float (C) then clean it carefully and reinstall it.
7. Remove the debris collection tank (D) and open its cover, then clean it carefully and reinstall it on the vacuum hose.
8. Check the condition of the tank cover gasket (E).



**Note:** The gasket (E) allows the creation of a vacuum in the tank, which is necessary to suck up the recovery water.

9. If necessary, replace the gasket (E) by removing it from its housing (F). When fitting the new gasket, position the joint (G) in the lower area, as shown in the figure.
10. Check that the seating surface (H) of the gasket (E) is in good condition, clean and suitable to form a seal with the gasket itself.
11. Close the recovery tank cover.

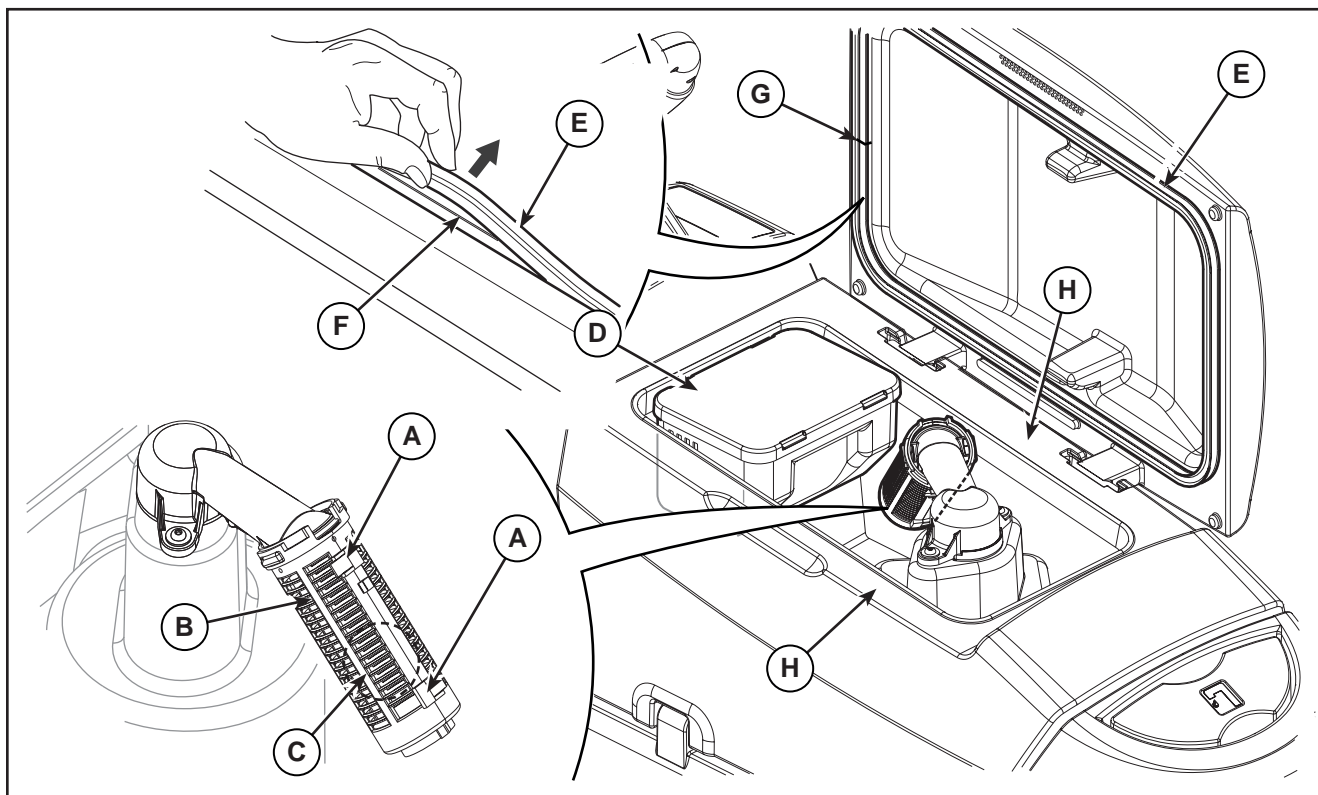


Figure 4:





## Troubleshooting

Trouble	Possible Causes	Remedy
The vacuum motor will not turn on	Wiring between Main machine controller (EB1) and vacuum motor (M2) damaged	Repair
	Main control board (EB3) faulty	Replace
	Vacuum motor fuse (F2) faulty	Replace
	Vacuum motor (M2) faulty	Check the amperage
Suction of dirty water is insufficient or non-existent	Activation of automatic float shut-off	Drain the recovery tank
	Debris collection filter dirty	Clean
	Vacuum grid with automatic float shut-off dirty	Clean
	Tank cover not correctly positioned	Adjust
	Tank cover seal damaged or not working correctly	Clean or replace
	Vacuum motor container dirty	Clean
	Vacuum seals damaged or not working correctly	Repair or replace

## Vacuum Motor Current Draw Test



**WARNING:** This procedure must be performed by qualified personnel only.

1. Disconnect the vacuum hose to the squeegee.
2. Remove the vacuum grid with the float, after the test reinstall it.
3. If present, drain the recovery tank, then lift it.
4. Apply the amp clamp (A) on the positive cable (grey) of the vacuum harness (B)
5. (If equipped) Turn the ignition key to “T”.
6. Press the Main button  to start the machine.
7. Activate the vacuum by pressing the Vacuum system button  to full power (Led on).
8. Activate the vacuum and check that the current draw of the vacuum motor is between 11 and 12 at 24V. Stop the vacuum. Remove the amp clamp (A).  
If the amperage is higher, perform the following procedures to detect and correct the abnormal amperage:
  - Remove the vacuum system motor (see the [“Container and vacuum motor disassembly/assembly”](#) paragraph), and check the condition of all its components.

If the above-mentioned procedures do not produce the correct readings for the vacuum system motor amperage, the motor must be replaced (see the [“Container and vacuum motor disassembly/assembly”](#) paragraph).

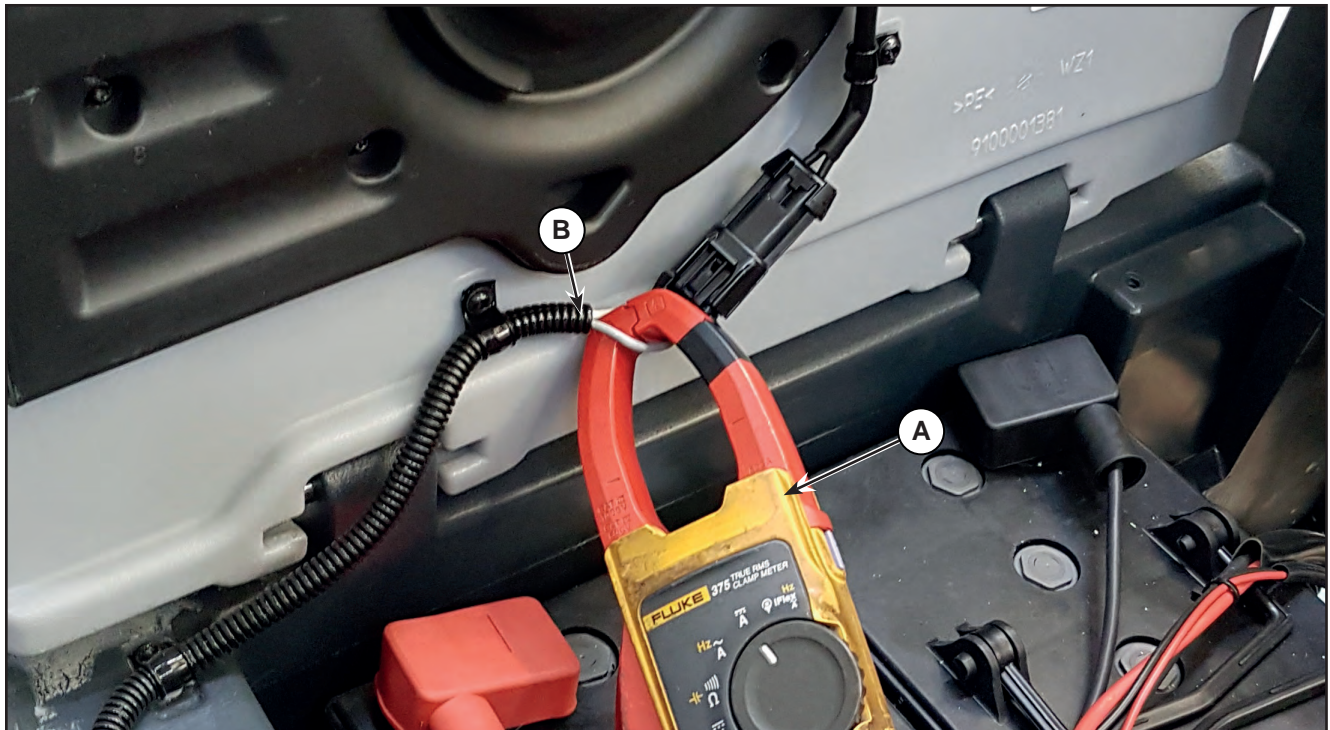


Figure 5:

## Removal and Installation

### Vacuum Motor Unit

#### Removal

1. Switch off the machine and disconnect the battery connector.
2. If present, drain the recovery tank, then lift it.
3. Disconnect the connector (A).
4. Unscrew the 5 screws (B) and the tie cable (C), then remove the Vacuum motor unit (D) from the machine.

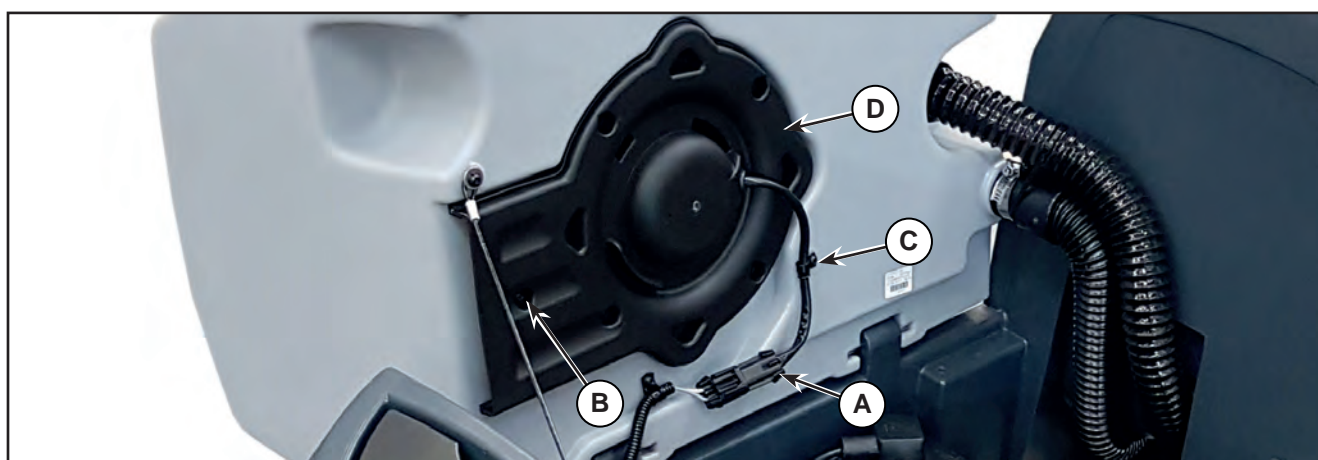


Figure 6:

## Container and Vacuum Motor Disassembly/Assembly

### Disassembly

1. Disassemble the vacuum system motor unit as shown in the previous paragraph.
2. At the workbench, remove the terminals lock (A) from the connector (B).
3. With a little screwdriver (C) move the spline lock (D) for disengaging the terminals from the connector.
4. Remove the two terminals (E).
5. Carefully, slightly lift the spline lock (D), previously pressed, to restore it.

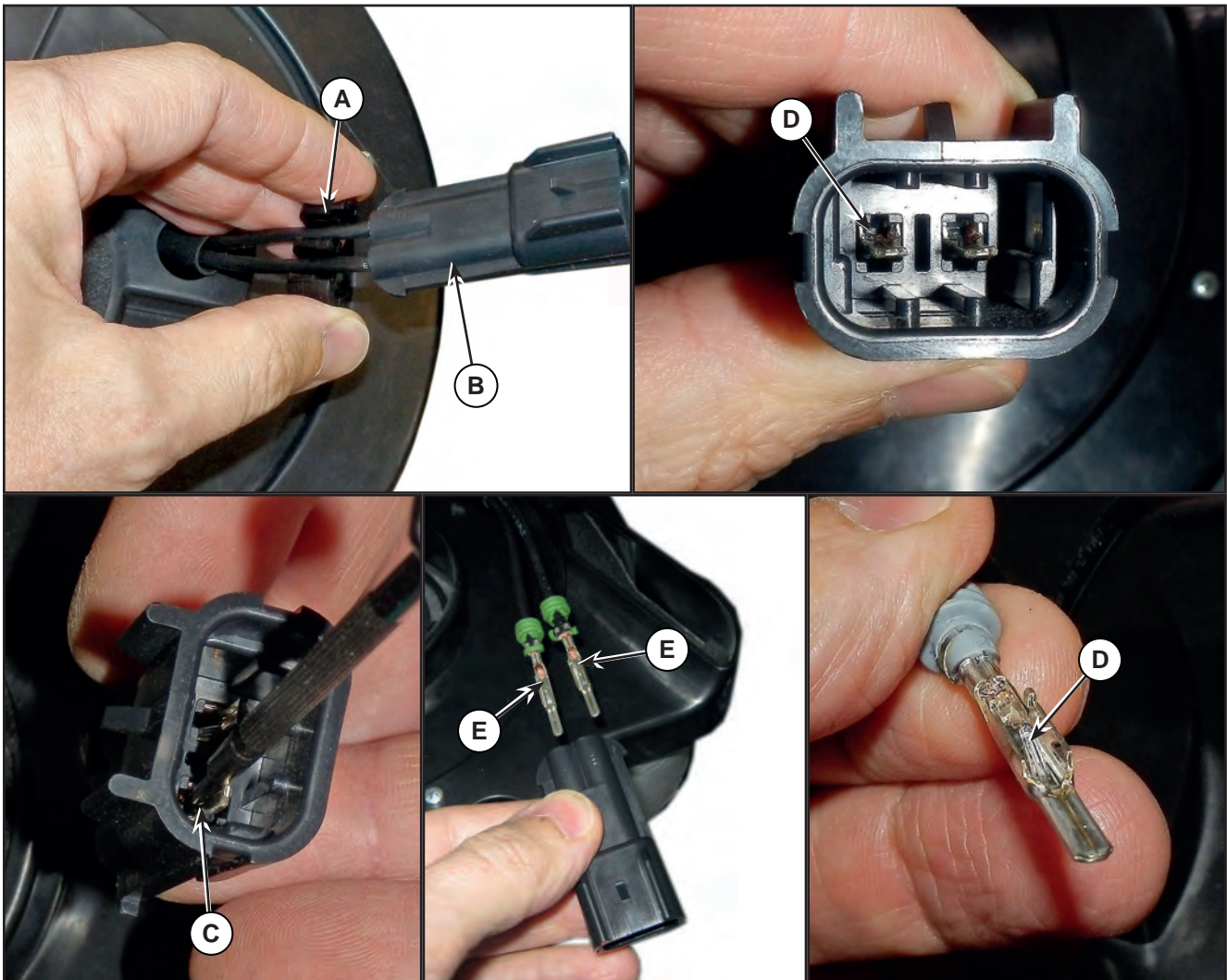
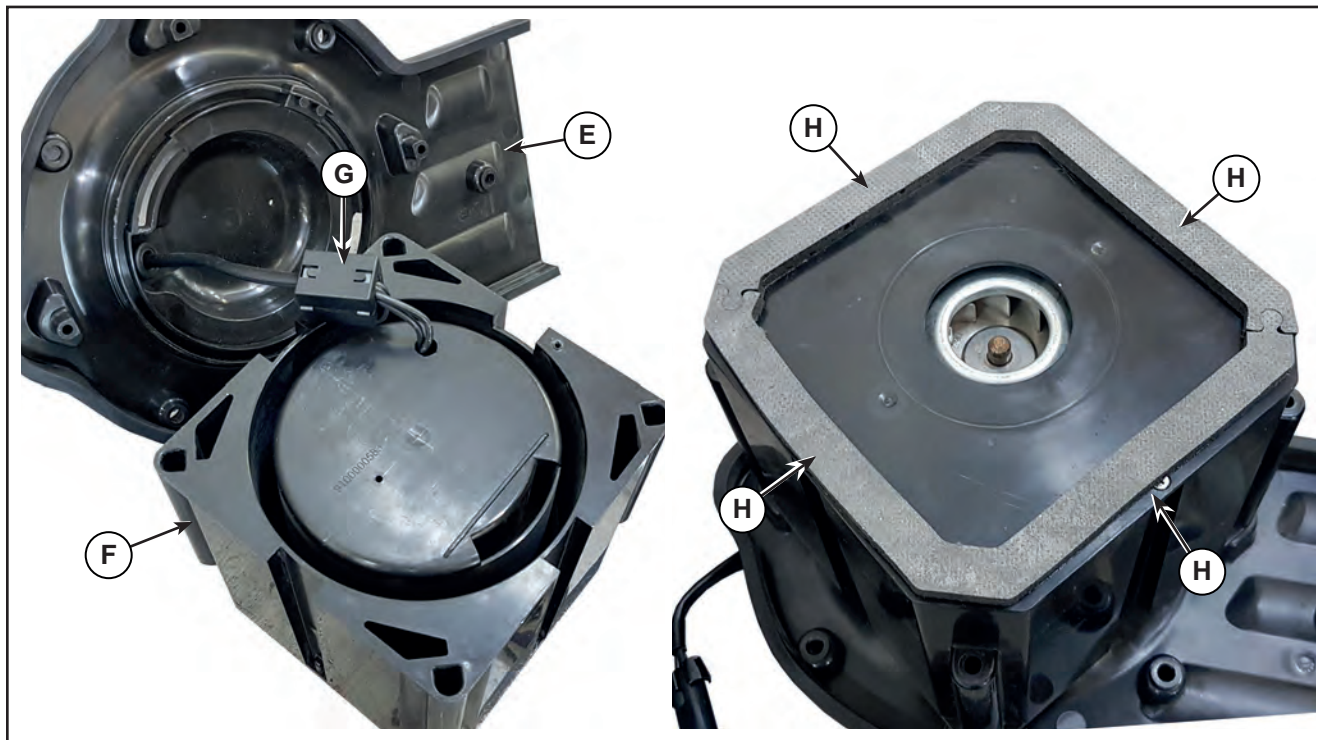


Figure 7:

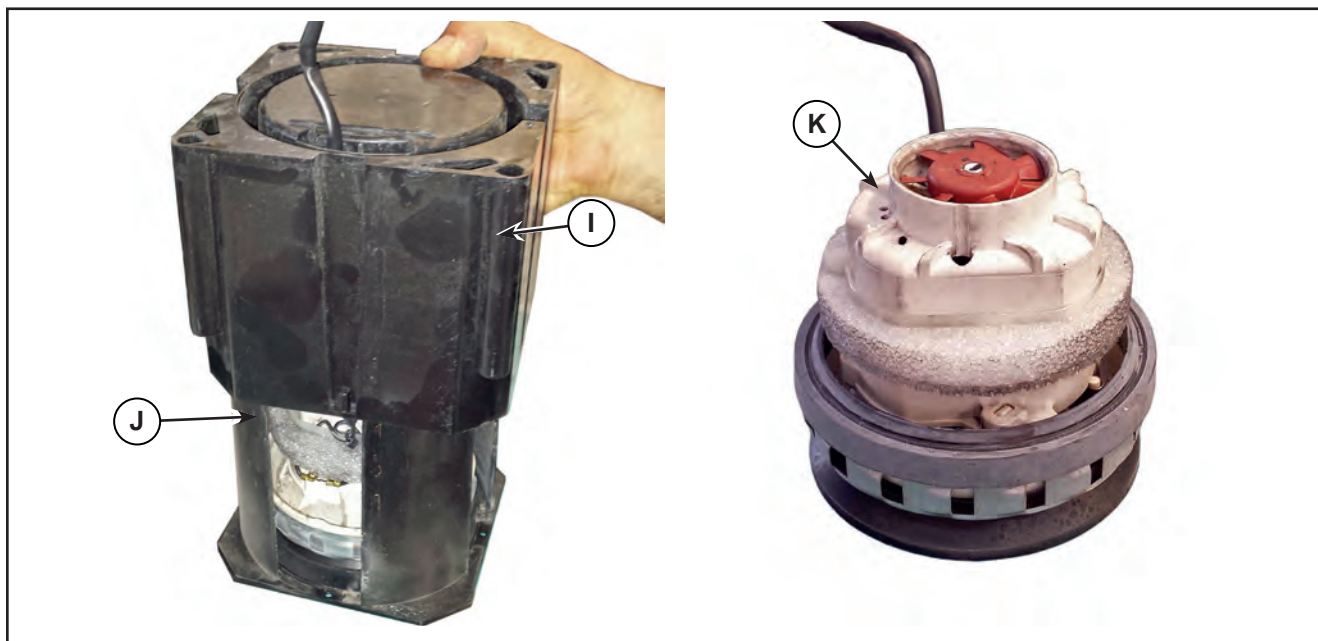


**Container and Vacuum Motor Disassembly/Assembly (continues)**

6. Remove the external soundproofing support (E) from the internal soundproofing case (F).
7. Remove the ferrite (G) from the wire.
8. Unscrew the 4 screw (H).

**Figure 8:**

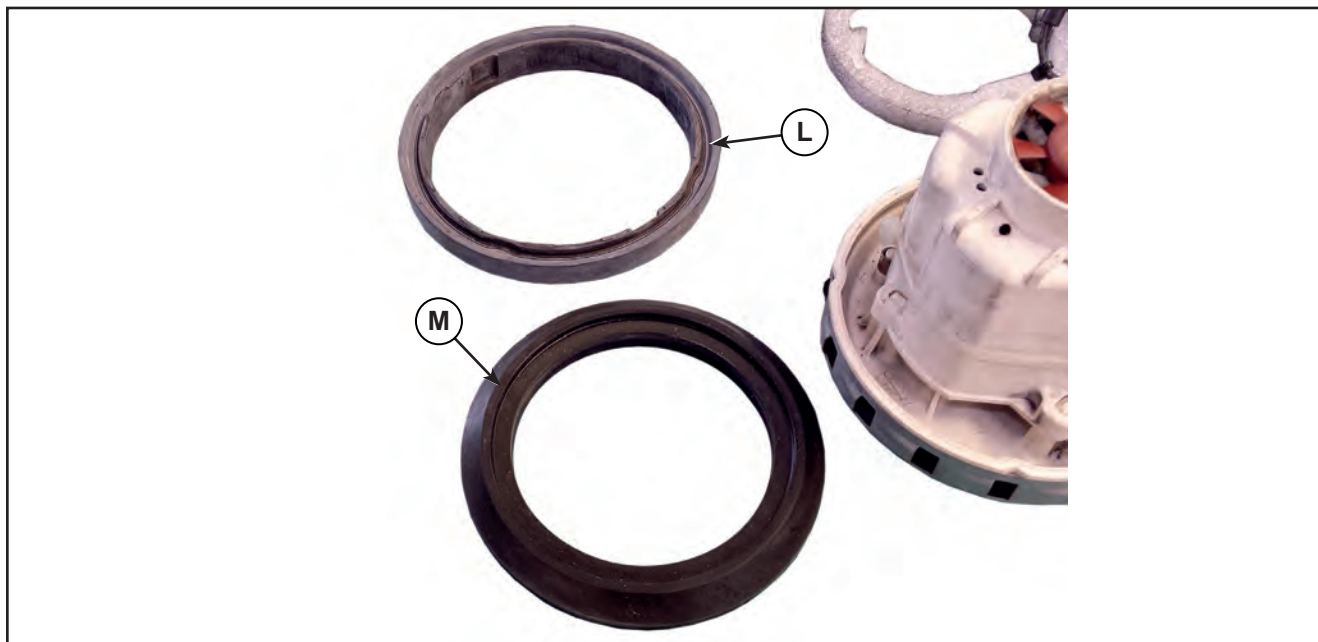
9. Lift the outer container (I) out of the inner container (J), then extract the motor (K).

**Figure 9:**



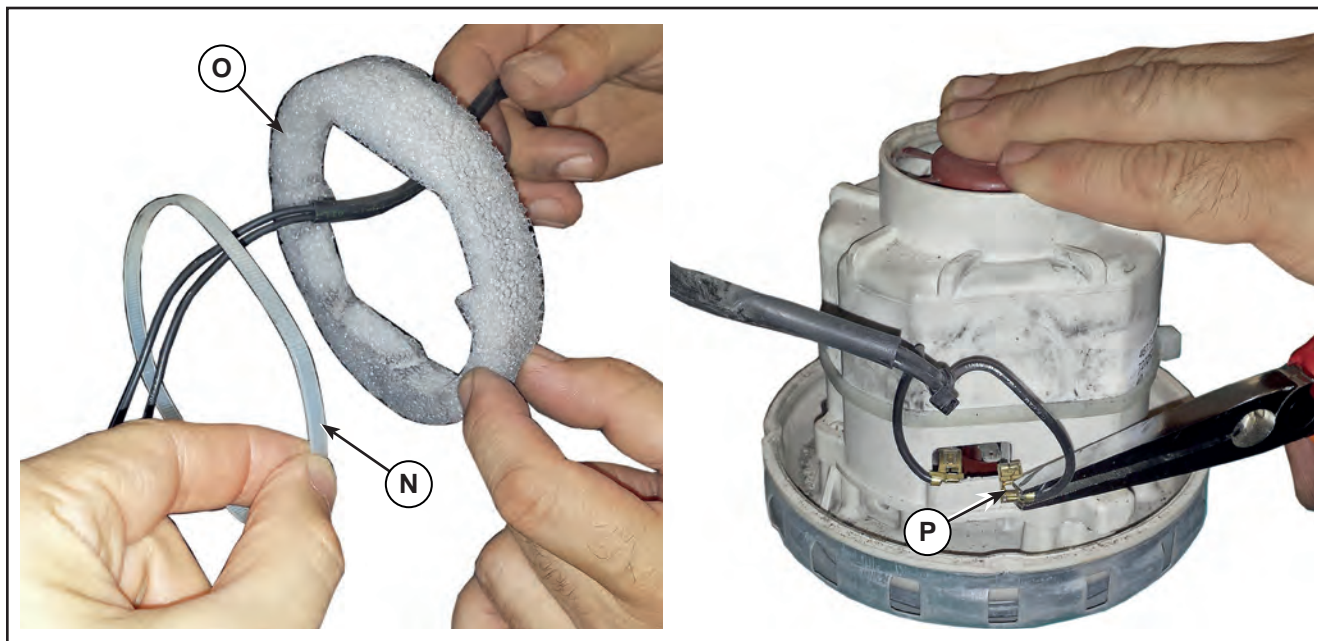
**Container and Vacuum Motor Disassembly/Assembly (continues)**

10. Save the gaskets (L) and (M).



**Figure 10:**

11. Remove the save the clamp (N) and the dividing sponge (O), then disconnect the connections (P).



**Figure 11:**

12. Clean the inside of the containers to remove any dirt which has accumulated, and check all gaskets for wear; replace if necessary.

## Container and Vacuum Motor Disassembly/Assembly (continues)

### Assembly

13. Position the gasket (Q) on the vacuum system motor. Check that the gasket is reassembled with the correct orientation (slots).
14. Install the clamp (R). The clamp must be positioned at 2.2 in (55 mm) from the upper surface, around the entire circumference.

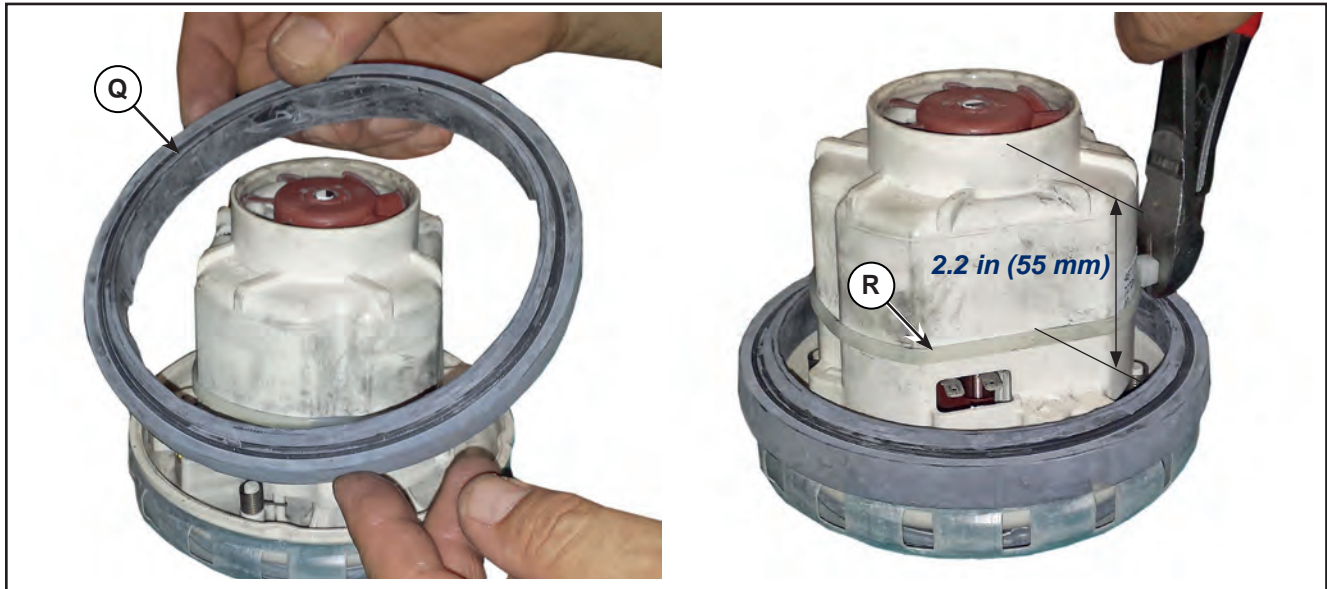


Figure 12:

15. Connect the power connections (S) and position the gasket (T) below the vacuum system motor. Check that the gasket is reassembled with the correct orientation.
16. Position the sponge ring (U) flush against the clamp (R). Check that the wiring is inside the sponge ring and that the sponge is correctly oriented.
17. Position the clamp (W) together with the wiring.

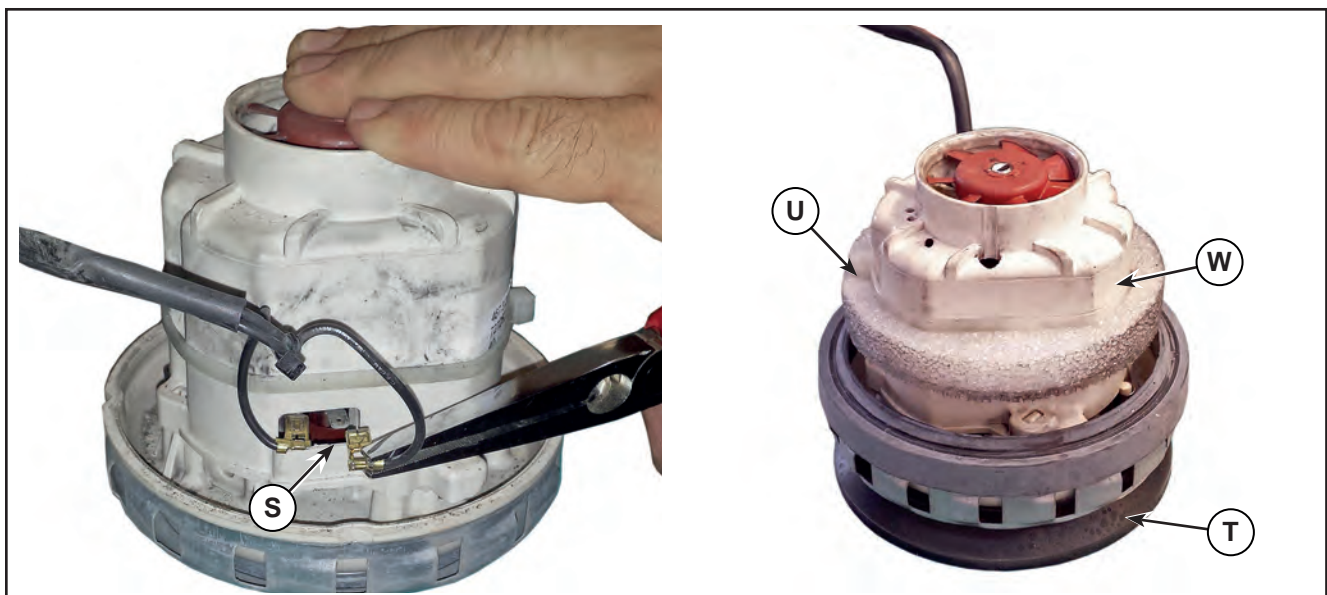
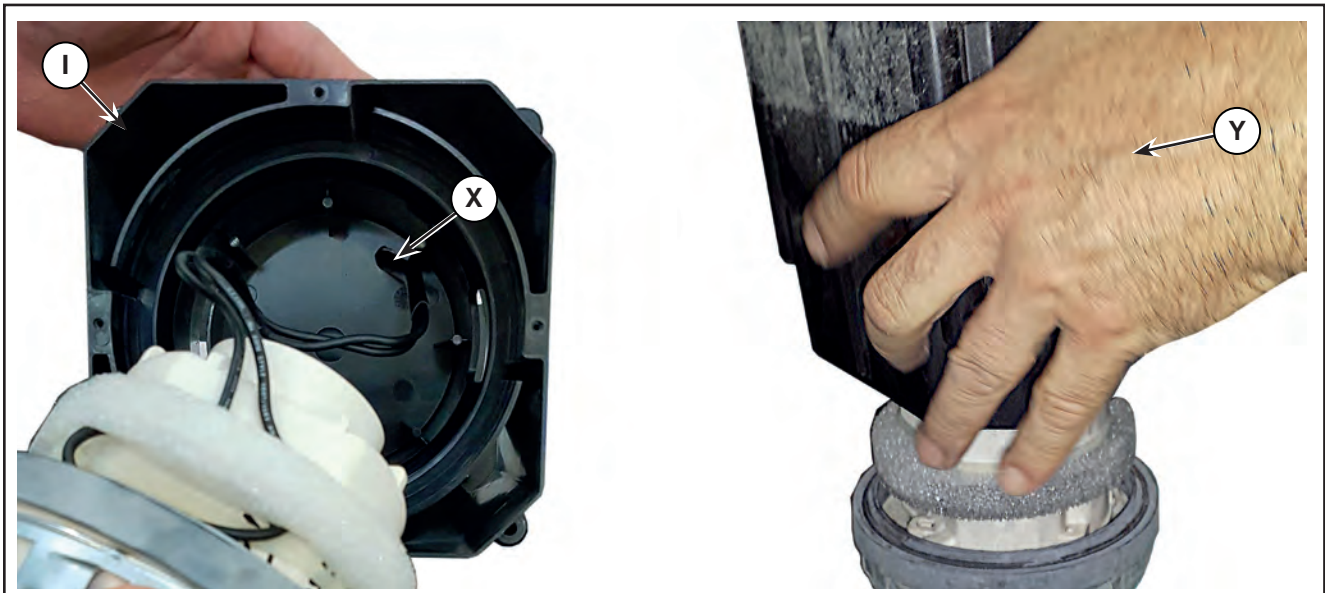


Figure 13:



**Container and Vacuum Motor Disassembly/Assembly (continues)**

18. Run the wiring (X) inside the hole in the outer container (I).
19. Insert the vacuum system motor in the outer container, as shown (Y).

**Figure 14:**

20. Rotate the outer container with the vacuum system motor. Check that the motor and gasket are positioned almost in line with the outer edge of the container.
21. Fit the inner container (J) and fasten it with the 4 screws.


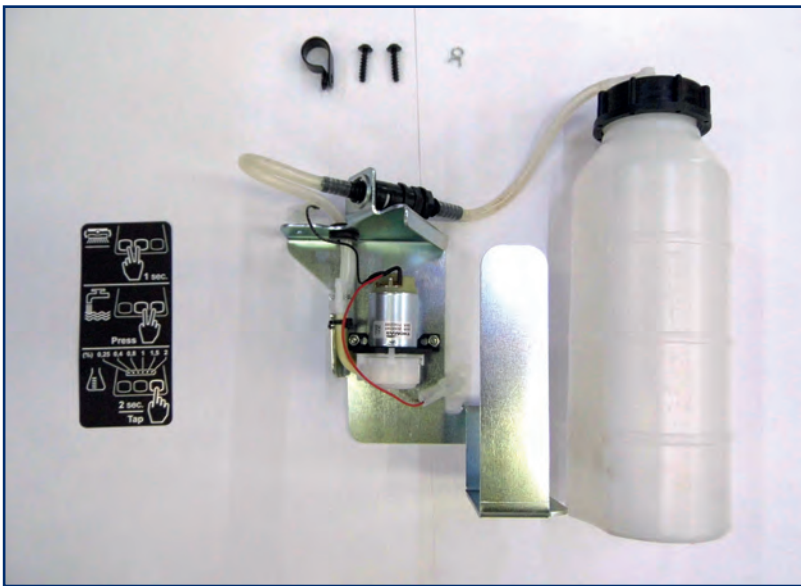
**Figure 15:**

22. Reassemble the components of the Vacuum motor unit on the machine location.


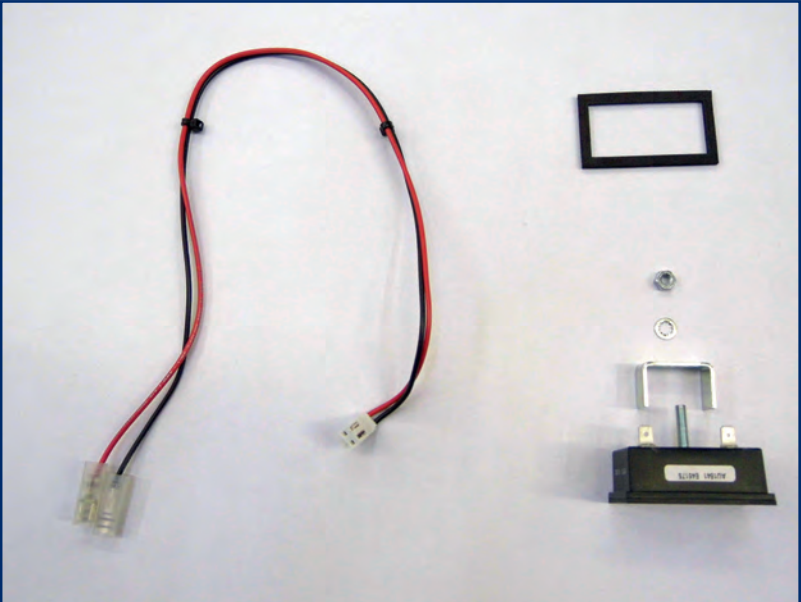
## Specifications

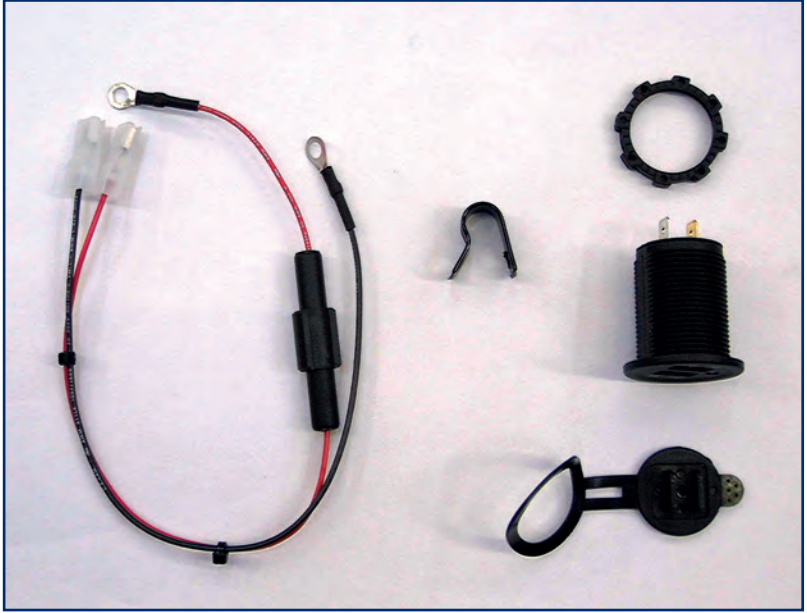
Description / Model	SC401, SCRUBTEC 344 / BATTERY
Recovery tank capacity	7,9 US gal (30 liters)
Vacuum motor technical data	0,4 hp (280 W)
Vacuum circuit capacity	35,4 in H <sub>2</sub> O (900 mm H <sub>2</sub> O)

## 90 - Options

Description	Illustration
<b>KEY KIT</b> (EU model only) <ul style="list-style-type: none"><li>• Switch ignition starter with cap</li><li>• Harness</li></ul>	
<b>DETERGENT KIT</b> (EU model only) <ul style="list-style-type: none"><li>• Detergent Bottle</li><li>• Insert-dry brake</li><li>• Cap</li><li>• Refill cap</li><li>• Hose</li><li>• Pump chemical mix</li></ul>	



Description	Illustration
<p><b>BATTERY CHARGER KIT</b></p> <p>(EU model only)</p> <ul style="list-style-type: none"><li>• Charger extention UK / EU</li><li>• Cable tie plug</li><li>• Charger battery</li><li>• Support battery charger</li><li>• Hardware</li></ul>	 The illustration shows the components of the Battery Charger Kit. It includes a black power cord with a UK/EU plug, a black cable tie plug, a black battery charger unit with a label, and a black support battery charger. There are also some small hardware items like screws and a gasket.
<p><b>COUNTER HOUR 24V KIT</b></p> <p>(All version)</p> <p>The hour counter displays the machine operating hours, calculated with the machine turned on and at least one of the Operator Presence Sensors (S1, S2) active.</p> <ul style="list-style-type: none"><li>• Counter hour 24V</li><li>• Gasket for counter hour</li><li>• Harness counter hour</li></ul>	 The illustration shows the components of the Counter Hour 24V Kit. It includes a red and black cable with a connector, a black gasket, and a black counter hour unit with a label.

Description	Illustration
<p><b>USB PORT KIT</b></p> <p>(All version)</p> <p>The USB socket enables to recharge an external device when the machine is turned on.</p> <ul style="list-style-type: none"><li>• USB port</li><li>• Harness USB</li><li>• Clamp cable black</li></ul>	 A photograph showing the components of a USB Port Kit laid out on a white surface. The components include: a black USB cable with a red and black wire, a black USB port, a black USB socket, a black USB cable clamp, a black USB cable, a black USB cable, and a black USB cable.